
TRAINING MANUAL

FAMILY: HPWH

MODELS: NUOS PLUS WI-FI
AQUANEXT PLUS NET
AEROTOP DHW .2

RELEASE: V.0 12/11/2020

Technical Manual - NUOS PLUS

Heat Pump Water Heater - Monoblock

12/11/2020 Ver.:1.0

200	250	250 SYS	250 TWIN SYS
 A tall, white, cylindrical heat pump water heater with a black control panel on the upper right side and a white access panel at the bottom.		 A tall, white, cylindrical heat pump water heater with a white control panel on the upper right side and a white access panel at the bottom.	

Because of continuing product improvements, we reserve the right to change specifications without prior notice.

All maintenance operations and interventions should be performed by qualified personnel (e.g. with the necessary requirements as outlined in the applicable norms in force).

TABLE OF CONTENTS

01 – CONSTRUCTION FEATURES	7
02 – TECHNICAL LABEL	8
03 – ELECTRICAL CONNECTIONS	9
04 – TECHNICAL DATA TABLE	10
05 – OPERATIONAL CURVES	12
06 – THERMODYNAMIC CYCLE	15
07 – COMPONENTS	16
07.1 – Compressor (*)	19
07.2 – Compressor start-up capacitor	19
07.3 – Electronic expansion valve (*)	19
07.4 – Evaporator (*)	20
07.5 – Fan	20
07.6 – Fan capacitor	20
07.7 – Hot gas valve (*)	21
07.8 – Electrical resistance (heating element)	21
07.9 – NTC temperature sensors	22
07.10 – Safety pressure switch (*)	23
07.11 – Electronic anti-noise filter	23
07.12 – Condenser (Component not supplied as spare part)	23
07.13 – Mainboard (Motherboard)	24
07.14 – TDC board	24
07.15 – HMI board	24
07.16 – Display	29
07.17 – Connection board	31
07.18 – Impressed current anode + Magnesium anode	31
07.19 – Refrigerant fluid R-134a	32
07.20 – “Service” valves	32
07.21 – Safety group and dielectric unions	32
08 – HEAT PUMP START-UP PROCEDURE	33
09 – FUNCTIONING MODES	34
09.1 – GREEN mode	34
09.2 – COMFORT mode	35
09.3 – FAST and BOOST mode	36
09.4 – i-MEMORY mode	37
09.5 – HC-HP mode	38
09.6 – HOLIDAY mode	39
09.7 – USER menu	40

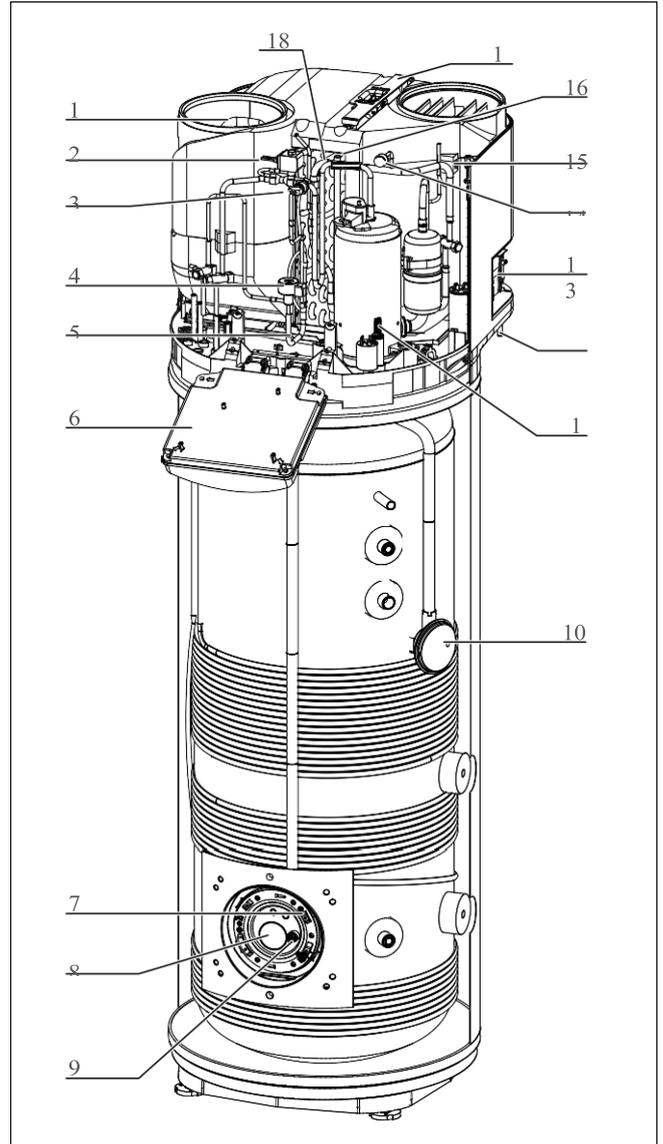
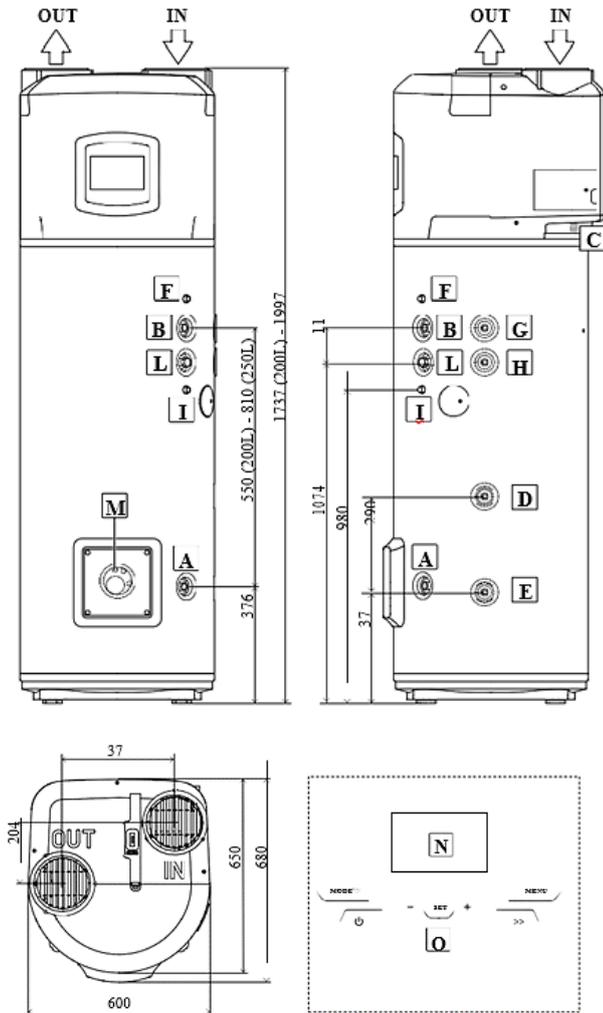
09.8 – PROGRAM mode	39
09.9 – INSTALLER menu	41
10 – FUNCTION MANAGEMENT	42
10.1 – P14 parameter.....	42
10.1.1 - STD	42
10.1.2 - OUT.....	42
10.1.3 - PRHE	42
10.1.4 - SYSTEM.....	42
10.1.5 - SYS and TWIN SYS STANDARD APPLICATION	43
10.2 – PV function (P11 parameter)	44
10.3 – SG function (P13 parameter)	45
10.4 – BUS connection	45
10.4.1 - Installations types with other heat generators	45
10.4.2 - SENSYS interface and connectivity.....	45
10.4.3 - SENSYS USER menu	46
10.4.4 - SENSYS INSTALLER menu	47
10.5 – Anti-legionnaire’s disease protection function (P2 parameter).....	55
10.6 – Silent (P6 parameter)	55
10.7 – Antifreeze function	55
10.8 – Defrost function	55
10.9 – Number of showers.....	55
10.10 – Reset function	55
10.11 – Wi-Fi connection	63
11 – TROUBLESHOOTING	58
12 – PROCEDURES OF CHECKING.....	60
12.1 – Preliminary operations.....	60
12.2 – Procedures	61
12.2.1 - Error 007.....	61
12.2.2 - Error 008.....	62
12.2.3 - Error 009.....	69
12.2.4 - Error 010.....	70
12.2.5 - Error 021.....	71
12.2.6 - Error 032.....	72
12.2.7 - Error 042.....	73
12.2.8 - Error 044.....	74
12.2.9 - Error 044.....	75
12.2.10 - Error 051.....	76

12.2.11 - Error 081.....	77
12.2.12 - Error 231.....	78
12.2.13 - Error 232.....	79
12.2.14 - Error 233.....	80
12.2.15 - Error 241.....	81
12.2.16 - Error 314.....	82
12.2.17 - Error 321.....	83
12.2.18 - Error 331.....	84
12.2.19 - Error 332.....	85
12.2.20 - Error 333.....	86
12.2.21 - Error 334.....	87
12.2.22 - Error 335.....	88
12.2.23 - Error 336.....	89
12.2.24 - Error 337.....	90
12.3 – Gas R134a Vacuum and Recharge procedure.....	97
12.4 – Cleaning of the evaporator filter.....	98
<i>13 – MALFUNCTIONS.....</i>	<i>99</i>
<i>APPENDIX A: INSTALLATION SITE INSPECTION</i>	<i>102</i>
Available installation accessories.....	104
<i>APPENDIX B: ROUTINE MAINTENANCE</i>	<i>106</i>

01 - CONSTRUCTION FEATURES

The floor-standing water heater consists of a top block containing the heat pump unit and the bottom part of the with the storage tank. There is a control panel with a display on the front part.

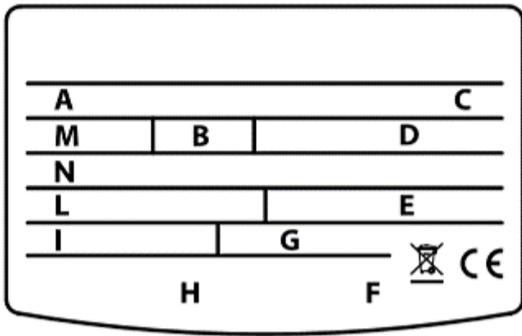
Dimensions and main components



A	Inlet cold water 3/4" pipe
B	Outlet hot water 3/4" pipe
C	Condensate drainage connection
D	Auxiliary circuit 3/4" inlet pipe (SYS and TWIN)
E	Auxiliary circuit 3/4" outlet pipe (SYS and TWIN)
F	Sheath for upper probe (S3) (SYS)
G	Auxiliary circuit 3/4" inlet pipe (TWIN SYS)
H	Auxiliary circuit 3/4" outlet pipe (TWIN SYS)
I	Sheath for upper probe (S4) (TWIN SYS)
L	Recirculation 3/4" pipe (SYS and TWIN SYS)
M	Sheath for bottom probe (S2) (SYS and TWIN SYS)
N	Display
O	Touch buttons.

1	Fan
2	Hot gas valve
3	Safety pressure switch
4	Electronic expansion valve
5	Evaporator inlet NTC temperature probe
6	Electronic box
7	Bottom NTC temperature probe (heating element zone)
8	Electric heating element
9	Impressed current anode
10	Top NTC temperature probe (hot water)
11	Hermetic rotary compressor
12	Condensate drain pipe
13	Lateral connections
14	Low pressure outlet
15	Air NTC temperature probe
16	Compressor suction NTC temperature probe
17	Evaporator filter
18	Evaporator

02 - TECHNICAL LABEL

	
A	Model
B	Tank capacity
C	Serial no.
D	Power supply voltage, frequency, maximum absorbed power
E	Max./min. pressure of the refrigeration circuit
F	Tank protection
G	Absorbed power – heating element mode
H	Marks and symbols
I	Max./min. power in heat pump mode
L	Type of refrigerant and charge
M	Maximum tank pressure
N	global warming potential / Quantity of fluorinated greenhouse gases

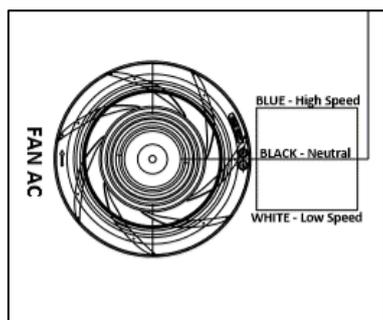
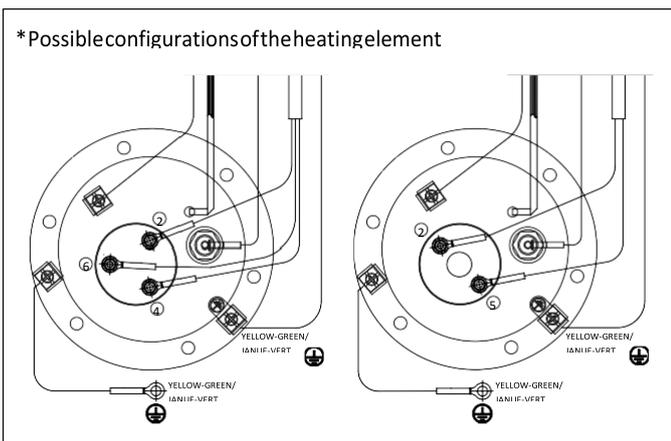
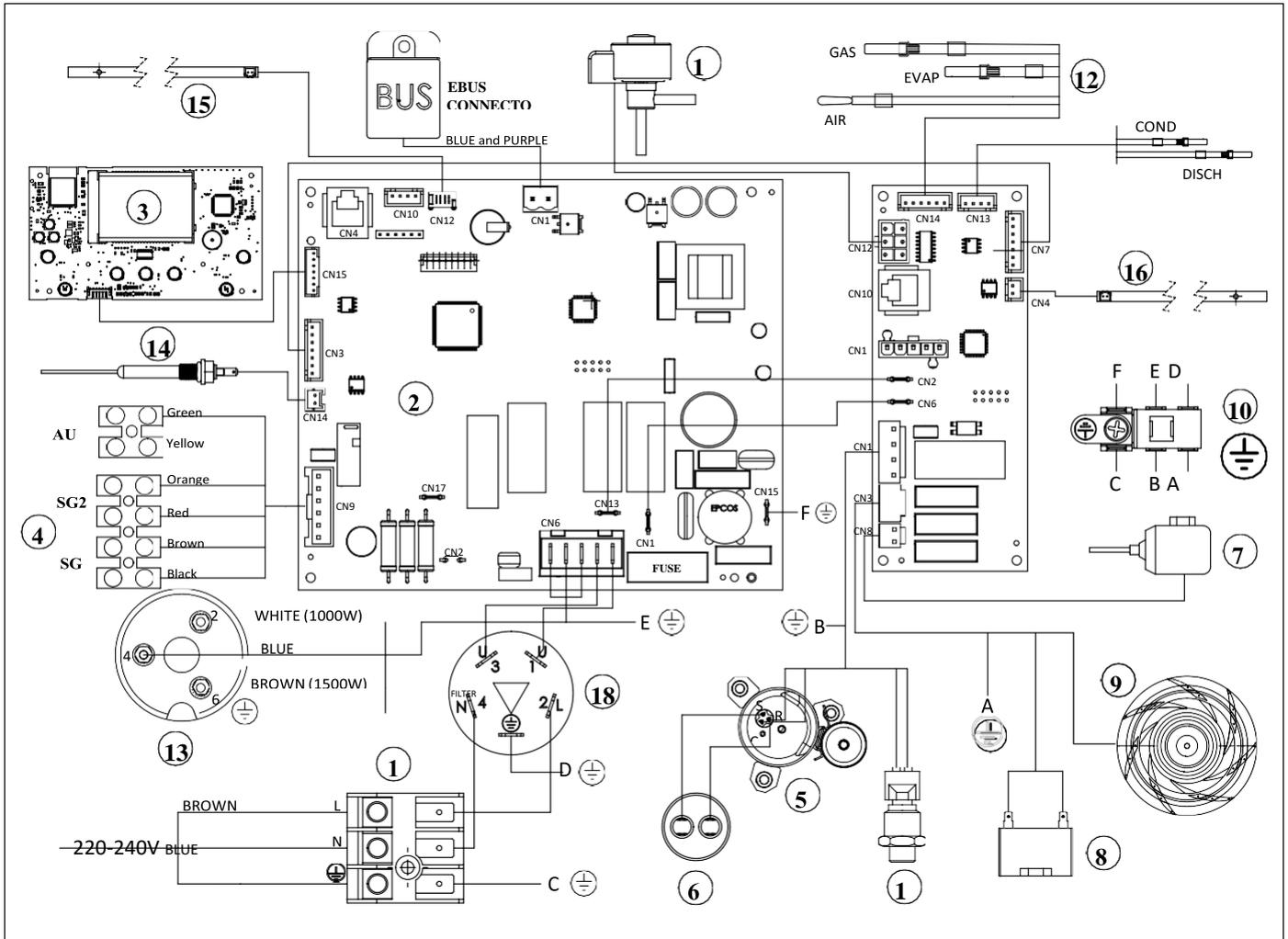
		
Mod. Nuos Plus Wi-Fi 200 NR. 306977509152700000102		
0.6 MPa	I 200	220-240 V~50Hz 2500W
GWP: 1430 / 1,859 t CO ₂ e		
R134a 1.30kg	P _{max} 2.7MPa/1MPa	
700W (900W _{max})		1500+1000W
Made in France	IPX4	CE 
Fe+Enamel	0407ed	

		
Mod. Nuos Plus Wi-Fi 250 NR. 306977609152700000101		
0.6 MPa	I 250	220-240 V~50Hz 2500W
GWP: 1430 / 1,859 t CO ₂ e		
R134a 1.30kg	P _{max} 2.7MPa/1MPa	
700W (900W _{max})		1500+1000W
Made in France	IPX4	CE 
Fe+Enamel	0407ed	

		
Mod. Nuos Plus Wi-Fi 250 SYS NR. 306977709152700000105		
0.6 MPa	I 245	220-240 V~50Hz 2500W
GWP: 1430 / 1,859 t CO ₂ e		
R134a 1.30kg	P _{max} 2.7MPa/1MPa	
700W (900W _{max})		1500+1000W
Made in France	IPX4	CE 
Fe+Enamel	0407ed	

		
Mod. Nuos Plus Wi-Fi 250 TWIN SYS NR. 306977809152700000106		
0.6 MPa	I 240	220-240 V~50Hz 2500W
GWP: 1430 / 1,859 t CO ₂ e		
R134a 1.30kg	P _{max} 2.7MPa/1MPa	
700W (900W _{max})		1500+1000W
Made in France	IPX4	CE 
Fe+Enamel	0407ed	

03 - ELECTRICAL CONNECTIONS



1	Power supply (220-230V 50Hz)
2	Mainboard (motherboard)
3	Interface board (display or HMI)
4	Connection board
5	Hermetic rotary compressor
6	Operation condenser (15µF 450V)
7	Hot gas valve
8	Condenser fan
9	Fan
10	Earth pole
11	Pressure transducer
12	Air/Evaporator/Suction NTC temperature probes
13	Electric heating element (*)
14	Impressed current anode
15	Bottom NTC temperature probe (heating element zone)
16	Top NTC temperature probe (hot water)
17	Safety pressure switch
18	Filter

04 – TECHNICAL DATA TABLE

DESCRIPTION	Unit	200	250	250 SYS	250 TWIN SYS
Rated tank capacity	l	200	250	245	240
Insulation thickness	mm	≈ 50			
Type of internal tank protection		enamelling			
Type of corrosion protection		Titanium impressed current anode + disposable magnesium anode			
Maximum operating pressure	MPa	0,6			
Diameter of hydraulic connections	II	G 3/4 M			
Diameter of condensate drainage connection	mm	14			
Diameter of air exhaust/intake pipes	mm	150-160-200			
Minimum water hardness	°F	12			
Minimum conductivity of the water	µS/cm	150			
Weight when empty	kg	90	95	115	130
Heating bottom circuit exchange surface	m ²	-	-	0,65	0,65
Heating top circuit exchange surface	m ²	-	-	-	0,65
Max water temperature with external integration	°C	-	-	75	75
HEAT PUMP					
Average electrical power consumption	W	700			
Max. electrical power consumption	W	900			
Quantity of refrigerant fluid (R134a)	kg	1,3			
Quantity of fluorinated greenhouses gases (R134a)	Tonn. CO ₂ eq.	1,859			
Global warming potential (R134a)	GWP	1430			
Max. pressure of refrigerating circuit (low-pressure side)	MPa	1			
Max. pressure of refrigerating circuit (high-pressure side)	MPa	2,7			
Max. water temperature with heat pump	°C	62			
EN 16147 ^(A)					
COP ^(A)		3,10	3,35	3,14	3,21
Heating time ^(A)	h:min	03:59	05:23	05:24	05:15
Heating energy consumption ^(A)	kWh	2,478	3,346	3,264	3,224
Max. amount of hot water in a single intake V _{max} ^(A) , delivered at 55°C	l	256	336	333	325
Pes ^(A)	W	21	22	23	25
Tapping ^(A)		L	XL	XL	XL
812/2013 – 814/2013 ^(B)					
Q _{elec} ^(B)	kWh	3,72	5,66	6,04	5,86
l _{wh} ^(B)	%	130,0	138,0	129,0	133,0
Mixed water at 40°C V40 ^(B)	l	256	336	333	325
Temperature setting ^(B)	°C	55	55	55	55
Annual electricity consumption (average climatic condition) ^(B)	kWh/anno	790	1215	1299	1256
Load profile ^(B)		L	XL	XL	XL
Indoor sound power level ^(C)	dB(A)	55	55	55	55
HEATING ELEMENT					
Heating element power	V / W	Check product specification label			
Max. water temperature with heating element	°C	75			
Max. current consumption		IPX4			
POWER SUPPLY					
Voltage / max. power consumption	V / W	Check product specification label			
Frequency	Hz	50			
Protection rating		IPX4			
AIR SIDE					
Standard air flow rate (automatic modulating control)	m ³ /h	650			
Available static pressure	Pa	230			
Minimum volume of room of installation ^(D)	m ³	30			
Minimum ceiling height of room of installation ^(D)	m	1,940	2,200	2,200	2,200
Min. temperature of room of installation	°C	1			
Max. temperature of room of installation	°C	42			
Minimum air temperature (w.b. a 90% u.r.) ^(E)	°C	-10			
Maximum air temperature (w.b. a 90% u.r.) ^(E)	°C	42			

Further energy data is shown in the Product Data Sheet (Annex A) which is an integral part of this booklet. Products without a label and relative diagrams for water heater units and solar heating devices, specified by Regulation 812/2013, are not intended for use in manufacturing such units.

(A) Values obtained with outdoor air temperature of 7°C and relative humidity of 87%, inlet water temperature of 10°C and temperature set at 55°C (as per the provisions in EN 16147 and CDC 103-15/C-2018). Ducted product Ø200 mm.

(B) Values obtained with outdoor air temperature of 7°C and relative humidity of 87%, inlet water temperature of 10°C and temperature set at 55°C (as per the provisions of 2014/C207/03 -transitional methods of measurement and calculation). Ducted product Ø200 mm.

(C) Values obtained from the average of the results as per the provisions in EN 12102-2. Ducted product Ø200 mm.

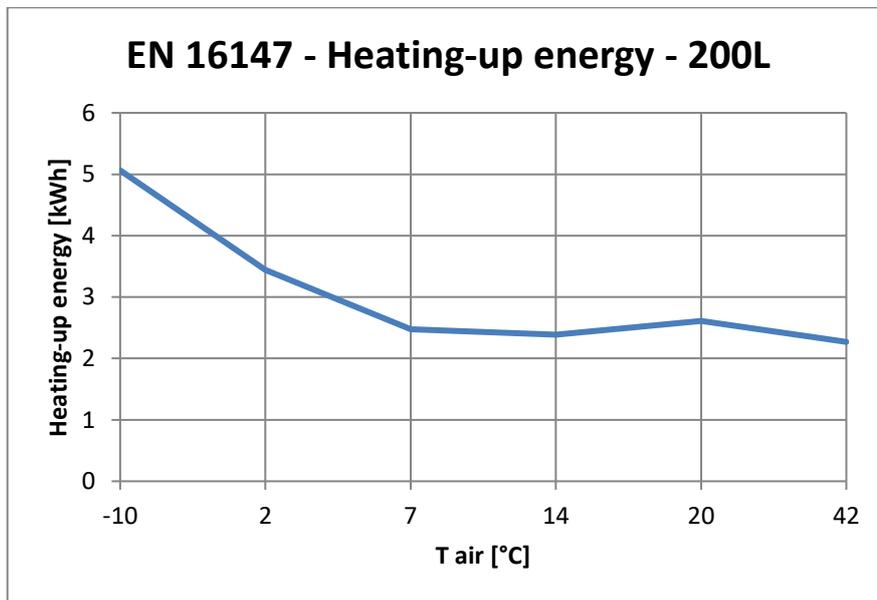
(D) Value that guarantees the correct operation and easy maintenance with non-ducted products. The correct operation of the product is nevertheless guaranteed up to a minimum height of 2.090 m.

05 – OPERATIONAL CURVES

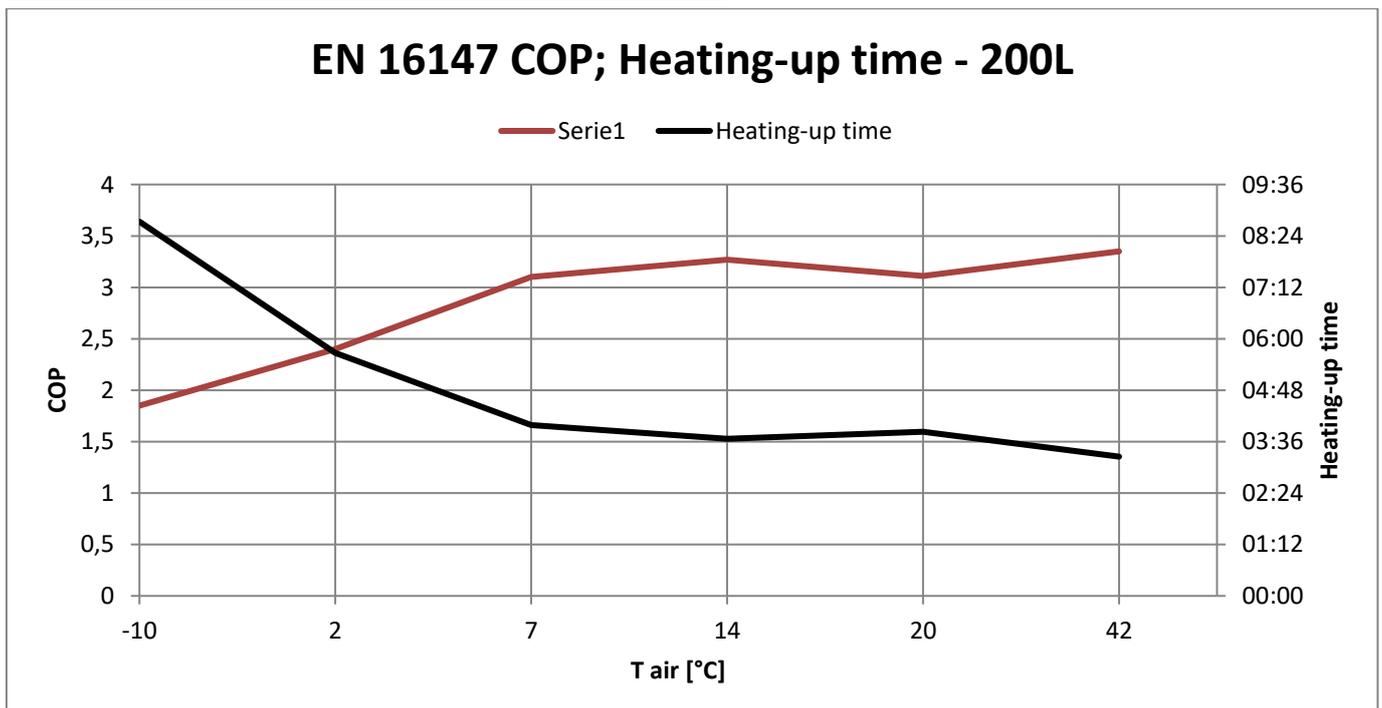
Conditions: inlet water temperature 10°C, set water temperature 55°C.

200 litres – GREEN mode			
<i>T_{air} [°C]</i>	<i>Heating-up energy consumption [kWh]</i>	<i>COP_t</i>	<i>Heating-up time [h:mm]</i>
-10	5,063	1,85	08:44
2	3,443	2,4	05:40
7	2,478	3,1	03:59
14	2,389	3,27	03:40
20	2,61	3,11	03:50
42	2,27	3,35	03:15

Heating up Energy consumption based on air temperature (EN 16147).



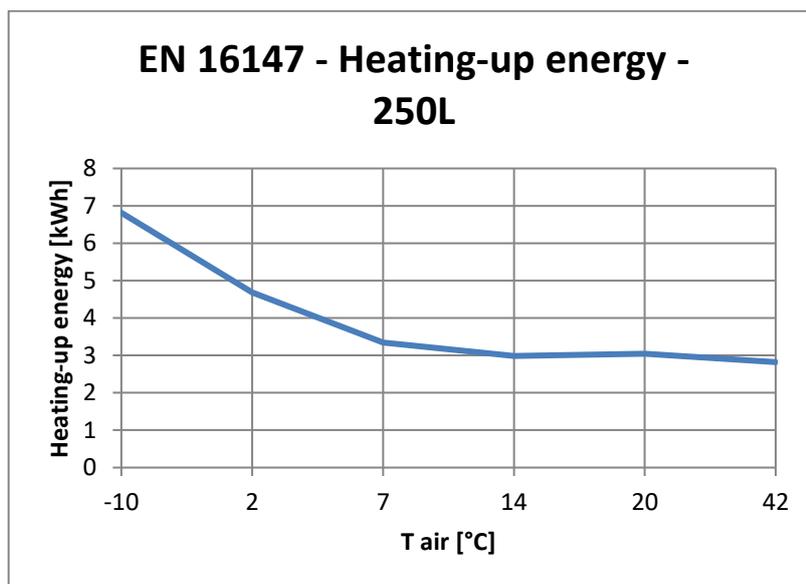
COP and HEATING-UP TIME based on air temperature (EN 16147).



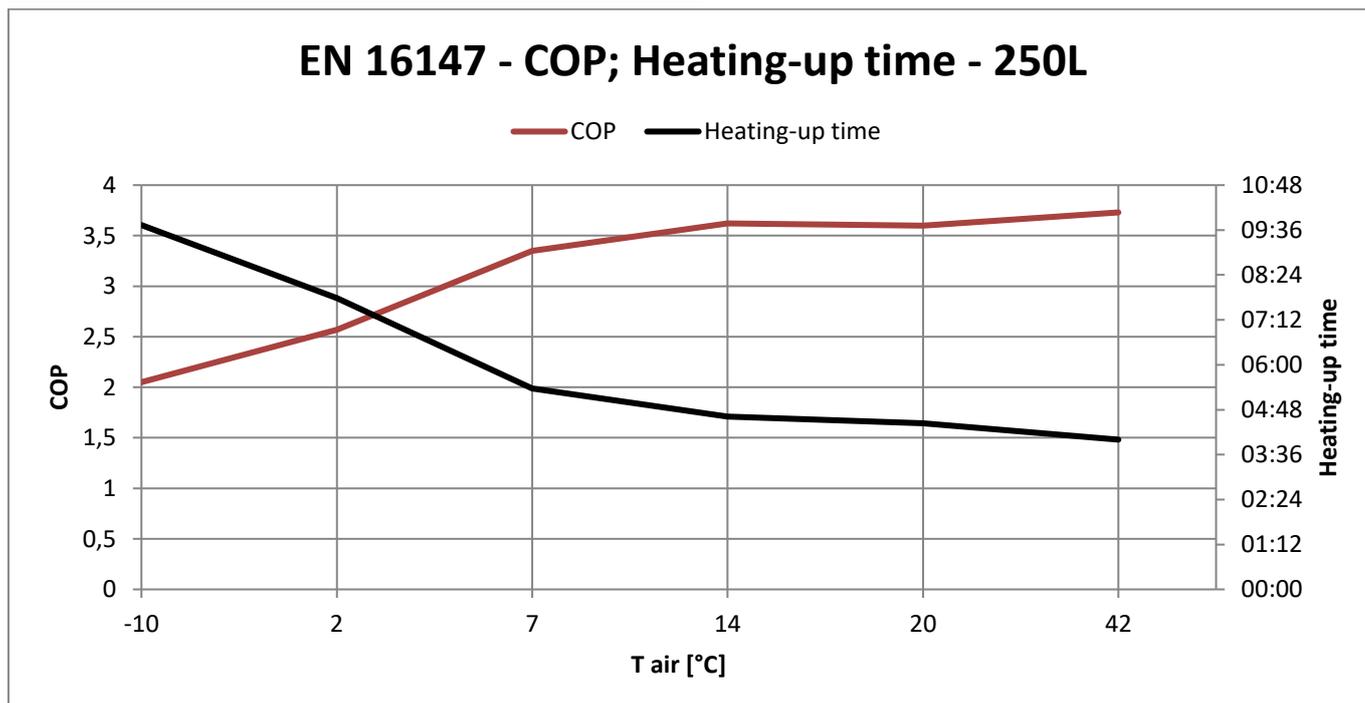
Conditions: inlet water temperature 10°C, set water temperature 55°C.

250 litres – GREEN mode			
<i>T_{air} [°C]</i>	<i>Heating-up energy consumption [kWh]</i>	<i>COP_t</i>	<i>Heating-up time [h:mm]</i>
-10	6,815	2,05	09:44
2	4,685	2,57	07:47
7	3,346	3,35	05:22
14	2,987	3,62	04:37
20	3,043	3,6	04:26
42	2,82	3,73	04:00

Heating up Energy consumption based on air temperature (EN 16147).



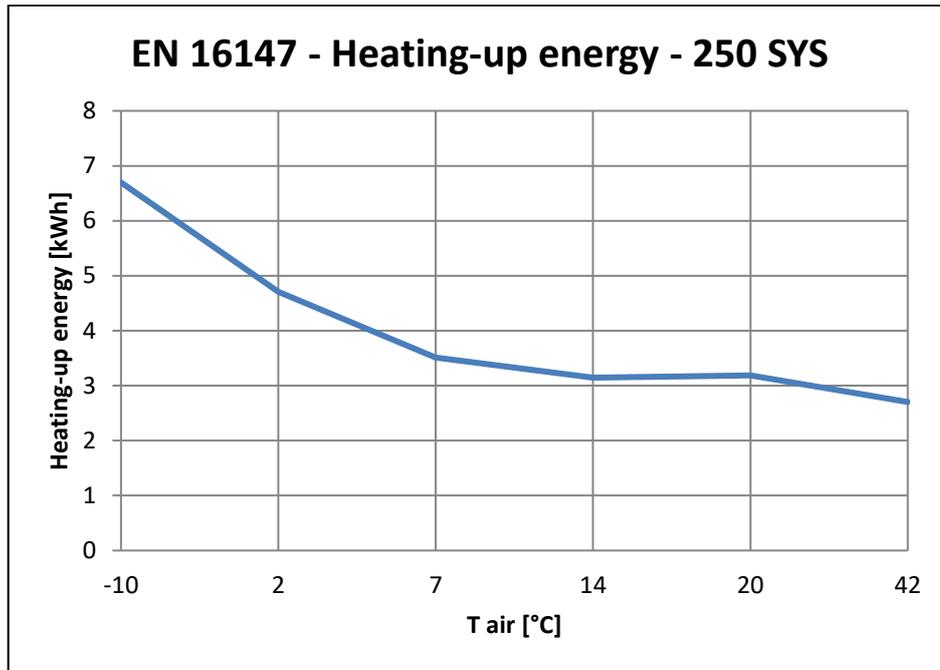
COP and heating up time based on air temperature (EN 16147).



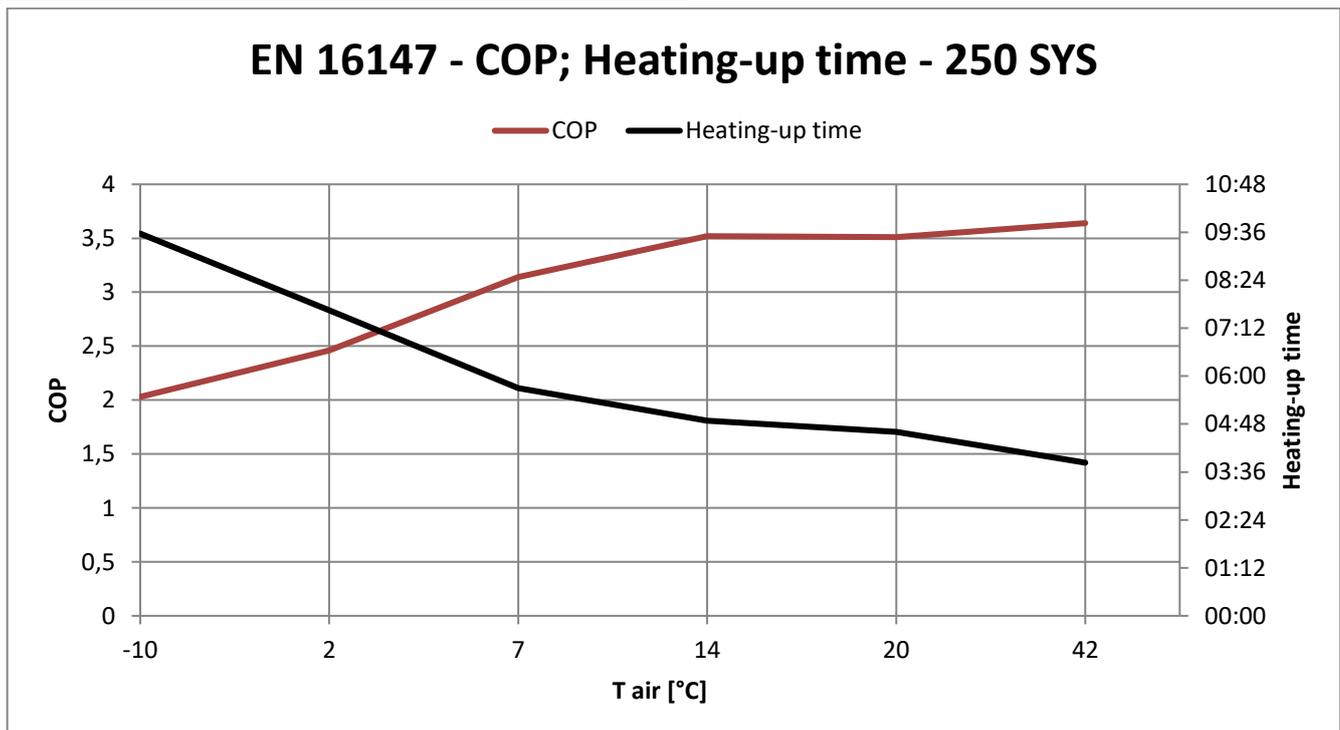
Conditions: inlet water temperature 10°C, set water temperature 55°C.

250 SYS – GREEN mode			
<i>T_{air} [°C]</i>	<i>Heating-up energy consumption [kWh]</i>	<i>COP_t</i>	<i>Heating-up time [h:mm]</i>
-10	6,698	2,03	09:34
2	4,71	2,46	07:39
7	3,512	3,14	05:42
14	3,144	3,52	04:53
20	3,189	3,51	04:36
42	2,703	3,64	03:50

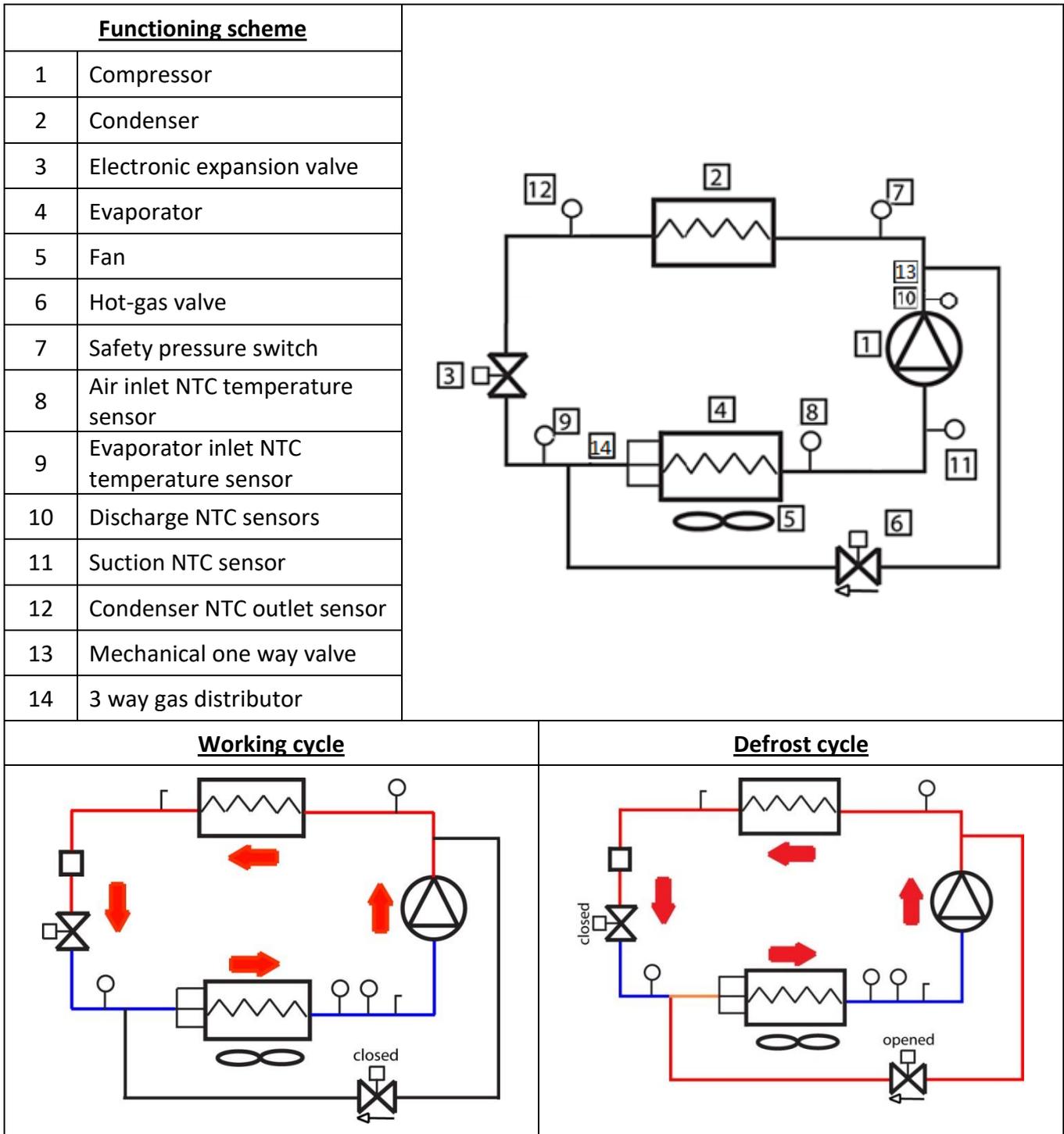
Heating up Energy consumption based on air temperature (EN 16147).



COP and heating up time based on air temperature (EN 16147).



06 - THERMODYNAMIC CYCLE



The heat pump water heater does not directly heat water using electrical energy, but makes a more rational use of the latter to obtain the same result in a more efficient manner.

The efficiency of a heat pump cycle is measured by the Coefficient of Performance (COP), e.g. the ratio between the energy supplied to the appliance (in this case, the heat transferred to the water to be heated) and the electrical energy used (by the compressor and the appliance's auxiliary devices).

The COP varies according to the type of heat pump and to its relative conditions of operation. For example, a COP value equal to 3 indicates that for every kWh of electrical energy used, the heat pump supplies 3 kWh of heat to water, of which 2 kWh are extracted from the free source.

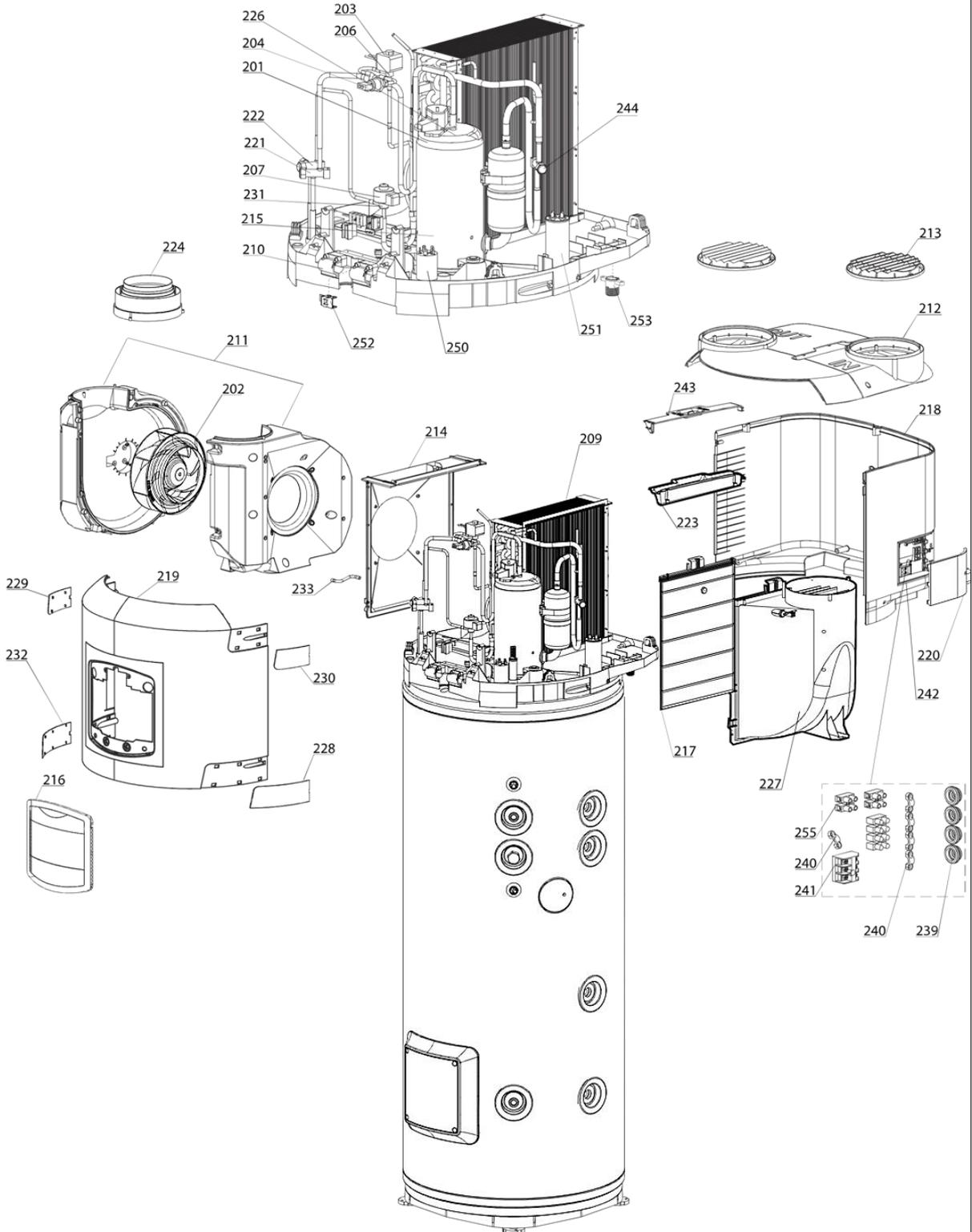
07 - COMPONENTS

EXPLODED VIEW

Heat pumps

Heat pumps

200



07.1 – Compressor

The compressor inhales the gas from the evaporator and compresses it in the condenser. Because of the job of compression, the vapor goes out of the compressor with more pressure and strongly overheated.

Maintain the conditions of operation of the compressor within the parameters reported in chart, if not respected, not only the performances won't be optimal, but it could present malfunctions and shortening of the life of the compressor.



Characteristic	Unit	Value
Compressor type	-	Rotary vane
Start condenser	$\mu\text{F}/\text{V}$	25/400
Max quantity of refrigerant R-134a (CH ₂ FCF ₃)	kg	1,3
Oil HAF68D1/HAF68D1U/ALPHA68HES or equivalent	ml	480 \pm 20
Mass (oil included)	kg	15,0
Power supply		1ph. 220-240V 50Hz
Power consumption	W	665/685

Possible Errors: 032 (refer to troubleshooting par.)

The following conditions are considered possible cause of risk:

- In the case of high or low tension with high ambient temperature (ex. 43°C)
- Return of fluid in liquid phase in the compressor
- Filling of the filter dehydrator
- Inclinations and movements of the appliance while the compressor is running
- Pipes bent
- Several abrupt starts/shutdowns

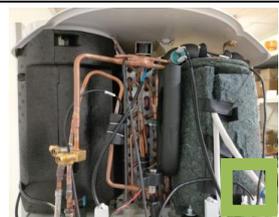


Pipe stress: the outlet copper pipeline from compressor is subject to vibrations. To avoid breakups, the constructor applies a component that limits the oscillations (damper); make sure it is intact and is not altered during maintenance operations.

07.2 – Compressor start-up capacitor

The capacitor has the purpose to start the compressor. It is located on the heat pump basement.

Capacity (μF)	Tension (V)	Frequency (Hz)	Terminals
25 \pm 5%	450	50/60	Faston 6.3mm



Possible Errors: 032 (refer to troubleshooting par.)

07.3 – Electronic expansion valve

Mainly constituted by a body valve. it is installed on the pipeline of the gas before the evaporator. It has input signal the refrigerant temperature and pressure measured on the outlet pipe of the evaporator. In base to these data the electronic expansion valve calibrates its opening in order to optimize the performance. The laminating valve has the assignment to reduce the pressure of the R134a.

The coil of the electronic expansion valve is easily disassembled turn it, it will be free to be removed.



Possible Errors: 081 (refer to troubleshooting par.)

07.4 – Evaporator

Inside the evaporator the fluid completes the passage of it from liquid to vapor. Evaporating absorbs heat from the air. The air “warm” taken by the environment is carried on the evaporator through a fan. The air crossing the evaporator heats the fluid. This air “cold” is expelled through the exit of the air. For allowing a great heat exchange, the air crossing the evaporator is guided by some wings inside the air inlet conveyor. The fan is located inside the fan housing after the evaporator. All air circuit is sealed thanks to these plastics assembled on the evaporator. Finally there is an air filter for capturing dust.

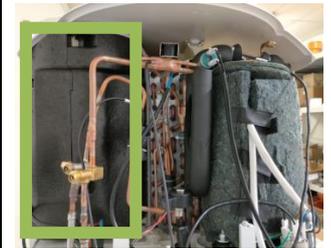


07.5 – Fan

The fan is installed inside the fan housing. For its maintenance remove the front, top, rear covers and fan housing (fan side).

- Tension: 230 V
- Frequency: 50/60 Hz
- Max. motor consumption: 107 W + 10%
- Rotation speed: 2420 RPM + 10%
- Insulation F

The centrifugal fan is AC type and it has a flow mass about 965 m³/h.



Possible Errors: 044 (refer to troubleshooting par.)

07.6 – Fan capacitor

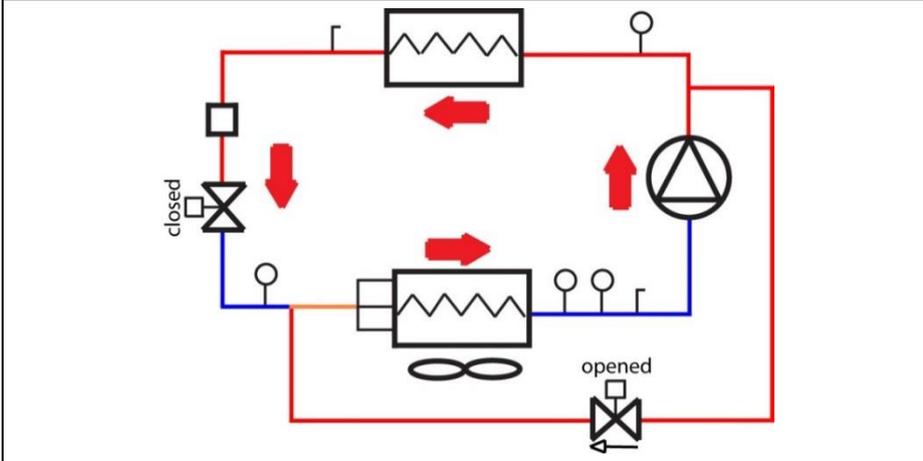
The fan capacitor is installed on the basement close to the fan housing. The capacitor has the purpose to start the fan.



Possible Errors: 044 (refer to troubleshooting par.)

07.7 – Hot gas valve

It is the valve that activates the DEFROST process, it opens itself canalizing the overheated refrigerant coming from the compressor to inlet the evaporator, in order to heat the evaporator and melt the ice that clogged it. The valve is controlled by mainboard. During the normal heating cycle, the valve is closed.



07.8 – Electrical resistance (heating element)

The heating element or electrical resistance is made in steatite and it is placed on bottom and frontal part of product and it is covered by a plastic cover. It is a unique body and if single or bi-power depends on brand.

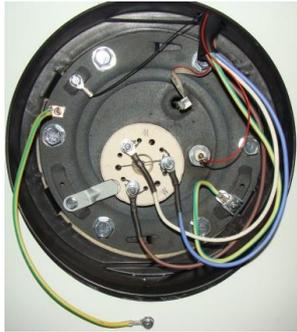
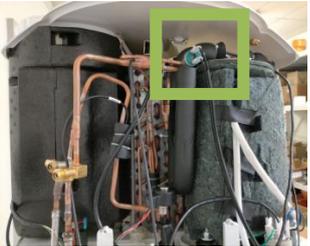
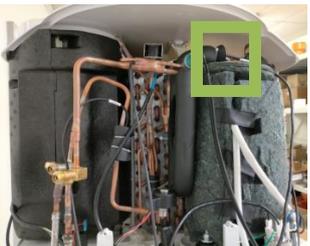
Ariston brand introduces always unique body with two electrical resistance, H1 (1500W) and H2 (1000W), while Chaffoteaux brand has only H1 of 1500W. When necessary, it has to integrate heat pump in order to guarantee hot water. For accessing to electrical resistance it is necessary unscrew the screws that fix plastic cover.



07.09 – NTC temperature sensors

There are several NTC temperature sensors to measure:

- Bottom water temperature (heating element zone);
- Top water temperature (dome - hot water);
- Air temperature;
- Evaporator inlet temperature;
- Compressor inlet temperature;
- Compressor discharge temperature;
- Condenser outlet temperature.

Bottom water temperature sensor (heating element zone)		Top water temperature sensor (hot water zone)	
			
Evaporator inlet temperature sensor		Compressor discharge temperature	
			
Compressor inlet temperature sensor		Air temperature sensor	
			
Condenser outlet temperature			
			

Possible Errors (refer to troubleshooting par.):

- **Top water temperature sensor 218**
- **Bottom water temperature sensor 230 / 231 / 232 / 233**
- **Air temperature sensor: 009**
- **Evaporator inlet temperature sensor 010**
- **Compressor inlet temperature sensor 012**
- **Condenser outlet temperature sensor 007**
- **Compressor discharge temperature sensor 008**

07.10 – Safety pressure switch

It has to guarantee that the pressure does not exceed the maximum pressure on high pressure side.

It is a screwed type component, in case to replace it using Thread seal tape (PTFE) to guarantee the sealing of gas circuit.

Type	Normally closed state
Voltage	250V AC
Current	5 A
Pressure to open	2,7 MPa (27 bar)
Pressure to close	1,8 MPa (18 bar)



Possible Errors: 051 (refer to troubleshooting par.)

07.11 – Electronic anti-noise filter

It filters possible electric disturbs both coming from the mains and generated by mother board. It is located inside the electric box.

Box	Plastics, component sealed with auto extinguisher resin
Terminals	5 Faston 6,3x0,8mm
Tension	125/250Vac
Current	16A (40°C)
Temperature range	-25°C/+100°C



07.12 – Condenser (Component not supplied as spare part)

The condenser is wrapped around the tank.

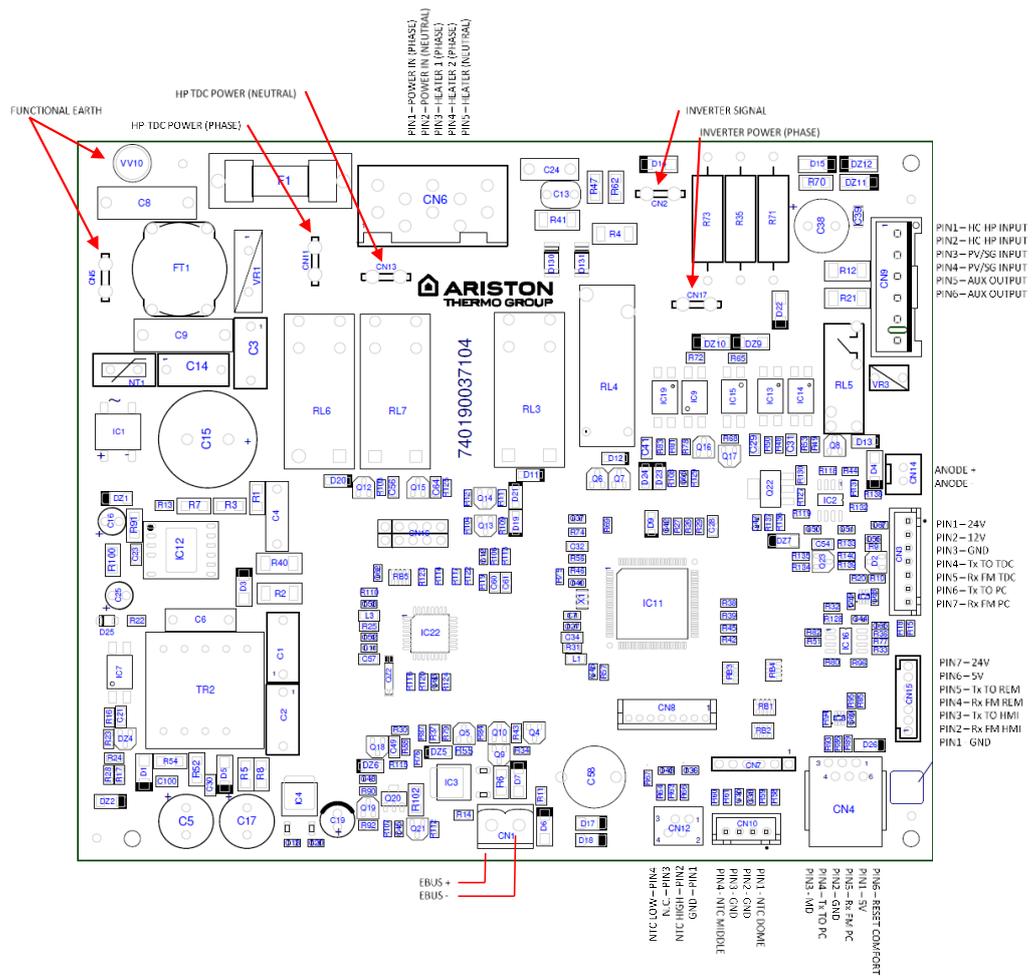
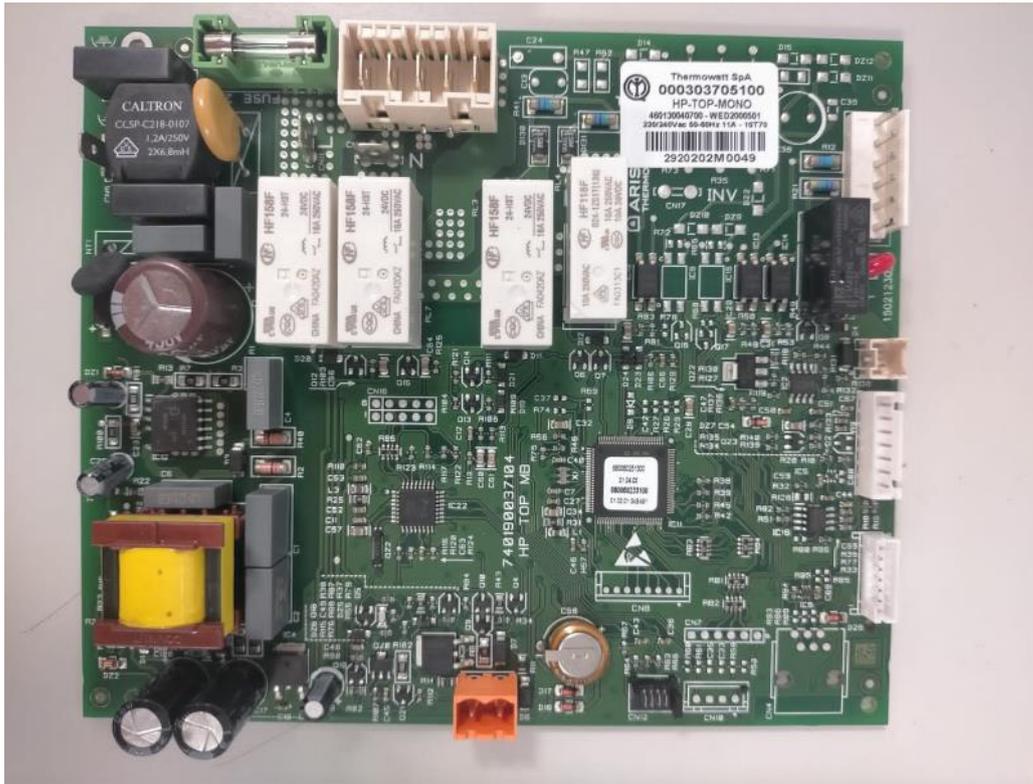
It receives vaporized refrigerant with high pressure and temperature from the compressor.

Inside it, the refrigerant changes its physical state, passing from vapour to liquid losing heat (given to the water) during the state passage.



07.13 – Mainboard (Motherboard)

Possible errors: 314, 321, 331, 332, 333, 334, 335 and 337 (refer to troubleshooting par.)

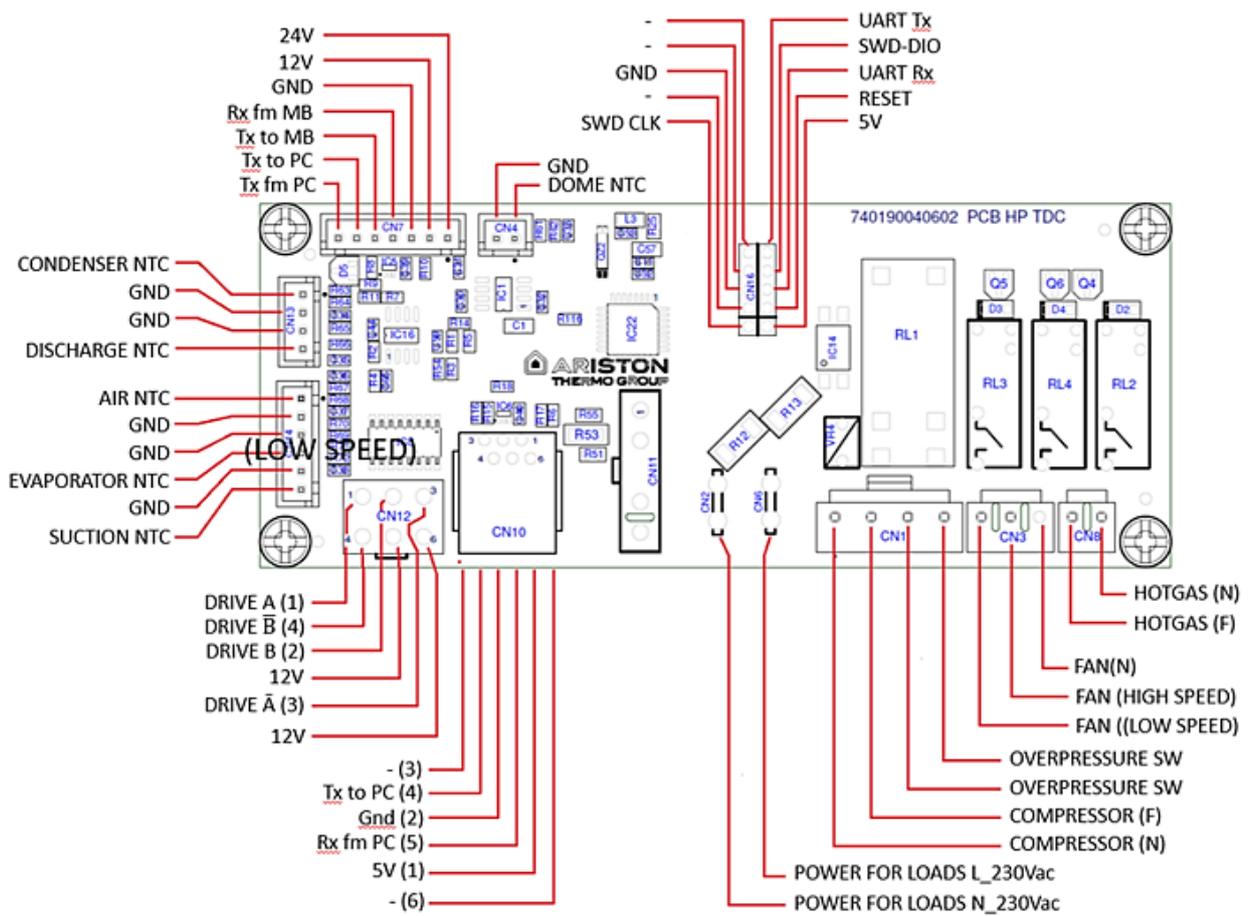


GENERAL	SPLIT VERSION	MONO VERSION	MAX LENGHT	NAME	PIN	DETAIL
EBUS	✓	✓	>10M	CN1	1	EBUS 2 +
					2	EBUS 2 -
INVERTER (SIGNAL)	✓		>10M	CN2	1	COMMUNICATION SIGNAL
TDC (THERMODINAMIC PCB BOARD)	NO	✓	>1M	CN3	1	24V
					2	12V
					3	GND
					4	TX TO TDC
					5	RX FM TDC
					6	TX TO PC
					7	RX FM PC
SERVICE	✓	NO	<1M	CN4	1	5V
					2	GND
					3	MD
					4	TX TO PC
					5	RX FM PC
					6	RESET COMF
POWER + HEATING ELEMENTS H1 / H2	✓	✓	>1M	CN6	1	POWER IN (Phase 230Vac)
					2	POWER IN (Neutral 230Vac)
					3	HEATER H1 (Phase 230Vac)
					4	HEATER H2 (Phase 230Vac)
					5	HEATERS H1/H2 (Neutral 230Vac)
COMFORT MCU (PROGRAMMING / DEBUG)	NO	NO	<1M	CN7	1	5V
					2	MD
					3	RESET COMF
					4	RX FM DEBUG
					5	TX TO DEBUG
					6	GND
DATA FLASH MODULE (OTA FUNCTION)	NO	NO	<1M	CN8	1	SCK
					2	WP
					3	RESET
					4	CS
					5	MOSI
					6	MISO
					7	GND
					8	5V
EXTERNAL INPUT /OUTPUT	✓	✓	>10M	CN9	1	HC-HP INPUT (230Vac)
					2	
	✓	✓	>10M		3	PV-SG INPUT (230Vac)
					4	
	NO	✓	>10M		5	AUX OUTPUT (MAX 2A COS > 0,8)
					6	
WATER NTC'S	✓	NO	<1M	CN10	1	NTC_DOME
					2	GND
	NO	NO	<1M		3	GND
					4	NTC_MIDDLE
HP-TDC POWER FOR LOADS	NO	✓	>1M	CN11	1	Phase 230Vac
WATER SAFETY NTC	✓	✓	>1M	CN12	1	GND
					2	NTC_HIGH
					3	-
					4	NTC_LOW
HP-TDC POWER FOR LOADS	NO	✓	>1M	CN13	1	Neutral 230Vac
ANODE	✓	✓	>1M	CN14	1	ANODE +
					2	ANODE -
HMI/REM	✓	✓	<1M	CN15	1	24V
					2	5V
					3	TX TO REM
					4	RX FM REM
					5	TX TO HMI

					6	RX FM HMI
					7	GND
SAFETY MCU (PROGRAM / DEBUG)	NO	NO	<1M	CN16	1	5V
					2	RESET
					3	UART RX
					4	SWD-DIO
					5	UART TX
					6	SWD CLK
					7	N.C
					8	GND
					9	N.C.
					10	N.C.
INVERTER POWER SUPPLY	✓	NO	>10M	CN17	1	Phase 230Vac
Earth	✓	✓		CN5	1	Functional earth for EMC

07.14 – TDC board

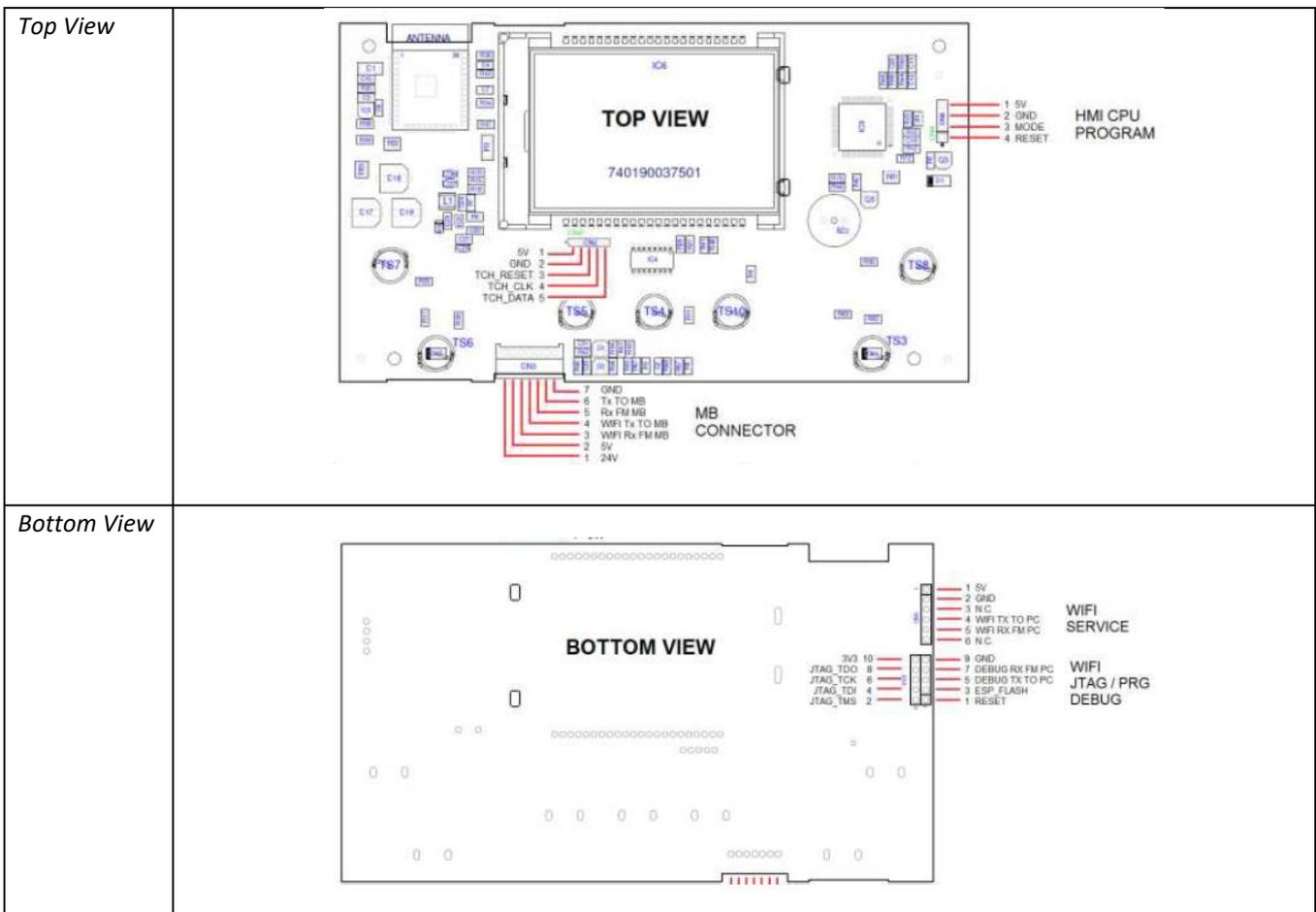
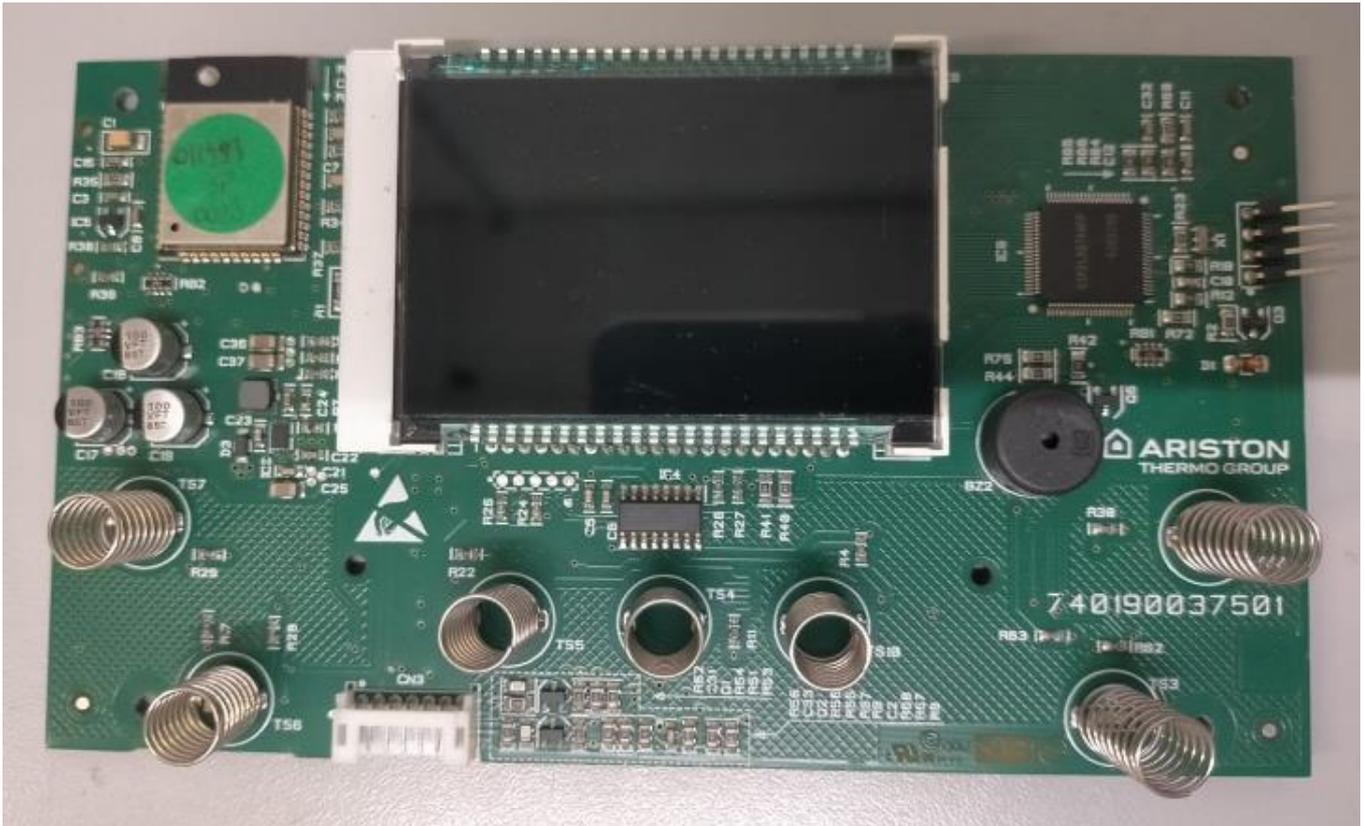
Possible errors: 334 (refer to troubleshooting par.)



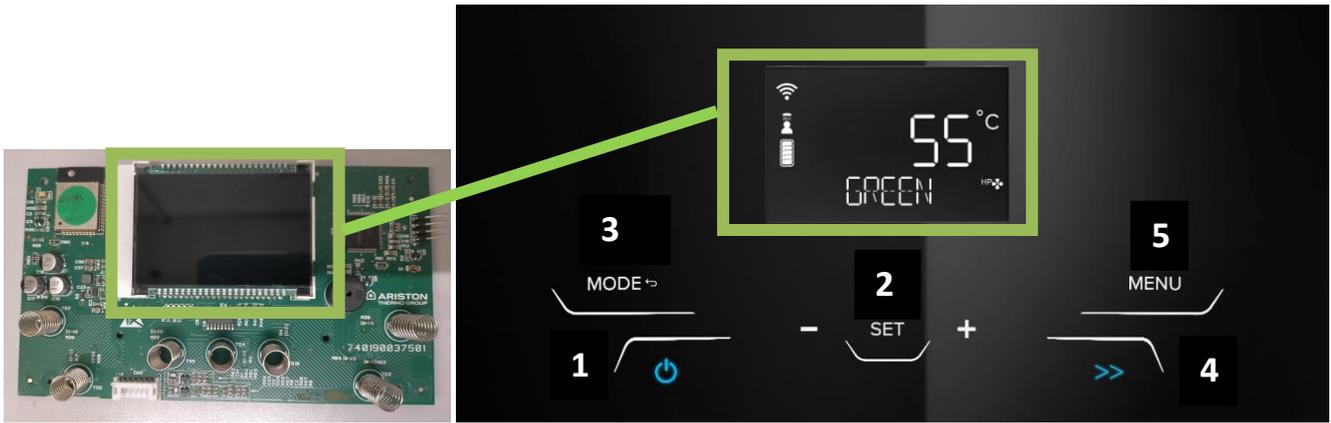
GENERAL	MAX LENGHT	NAME	PIN	DETAIL
COMPRESSOR	<1M	CN1	1	COMPRESSOR Neutral
			2	COMPRESSOR Phase
			3	OVERPRESSURE safety switch
			4	OVERPRESSURE safety switch
POWER SUPPLY FOR LOADS	>1M	CN2	1	Neutral 230Vac
FAN	<1M	CN3	1	FAN SPEED 1 (PHASE)
			2	FAN SPEED 2 (PHASE)
			3	FAN NEUTRAL
WATER NTC	<1M	CN4	1	NTC_DOME
			2	GND
POWER SUPPLY FOR LOADS	>1M	CN6	1	Phase 230Vac
MAIN BOARD	>1M	CN7	1	24Vdc
			2	12Vdc
			3	GND
			4	RX FM MB
			5	TX TO MB
			6	TX TO PC
			7	RX FM PC
HOTGAS	<1M	CN8	1	HOTGAS Phase
			2	HOTGAS Neutral
SERVICE	<1M	CN10	1	5 Vdc
			2	RX FROM PC
			3	GND
			4	TX TO PC
			5	-
			6	-
ELECTRONIC LAMINATING VALVE	<1M	CN12	1	MOTOR DRIVE "A"
			2	MOTOR DRIVE "B"
			3	MOTOR DRIVE "A"
			4	MOTOR DRIVE "B"
			5	12V
			6	12V
THERMODYNAMIC NTC'S	<1M	CN13	1	CONDENSER NTC
			2	GND
			3	GND
			4	DISCHARGE NTC
THERMODYNAMIC NTC'S	<1M	CN14	1	AIR NTC
			2	GND
			3	GND
			4	EVAPORATOR NTC
			5	GND
			6	SUCTION NTC
SAFETY MCU (PROGRAM / DEBUG)	<1M	CN16	1	5Vdc
			2	RESET
			3	UART RX
			4	SWD-DIO
			5	UART TX
			6	-
			7	-
			8	GND
			9	-
			10	SWD CLK

07.15 - HMI board

Possible errors: 331, 332, 333 and 336 (refer to troubleshooting par.)

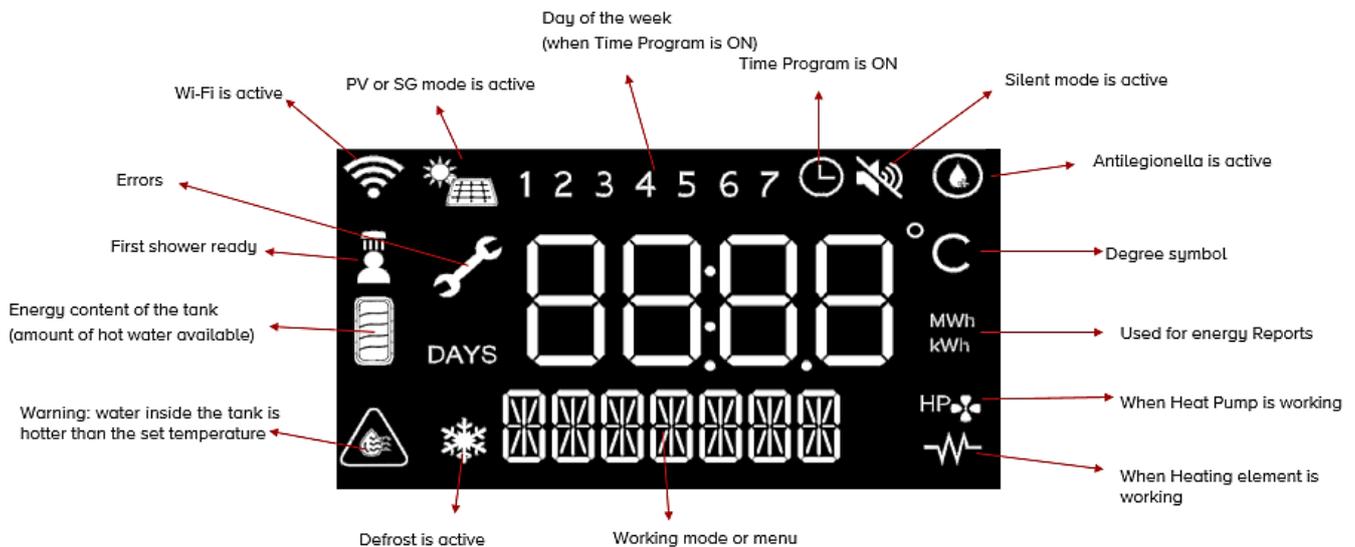


07.16 - Display



1	ON/OFF BUTTON	It switches on and switches off the product.
2	ENCODE/SET BUTTON	It is possible rotate it to surf menu or set T SET-POINT. It is possible push it to select the parameter.
3	MODE BUTTON	Pushing it is possible scroll the different function modes.
4	MENU BUTTON	It opens installer and user menu.
5	BOOST BUTTON	It temporarily activates the boost function.

Display icons:



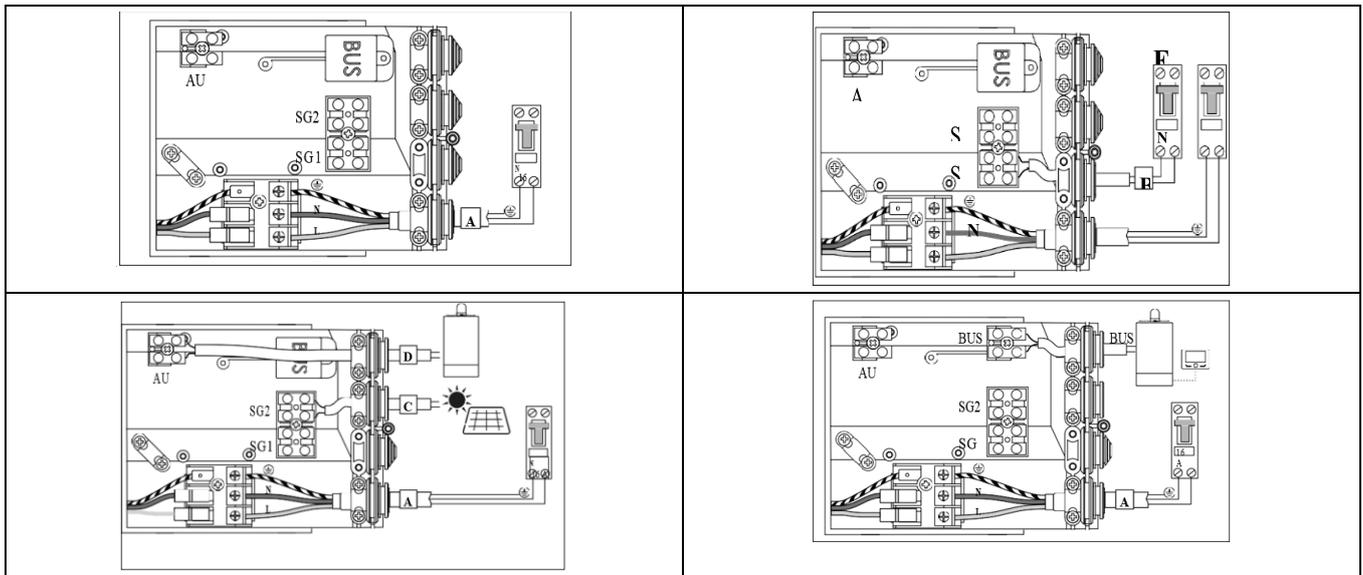
	Changeable parameter
	Wi-Fi enabled (only if present)
	Schedule programming enabled
	Day of the week (1 = Sunday)
	Heat pump active
	Heating element integration enabled
	ANTIBACTERIAL function is enabled
	PV or SG enabled (only if present) When the corresponding mode is active, the secondary string indicates it

	SILENT function is enabled
	ANTIGELO function is enabled
	Top temperature sensor > T SETPOINT + 5°C
	Hot water shower available
	Estimated Energy Content (based on the set temperature)

07.17 – Connection board

It is located on the lateral panel positioned on rear right side of the product.

1	Connection board	-
2	SIG1	Connection for EDF wire (input signal)
3	SIG2	Connection for photovoltaic or SG wire (input signal)
4	AUX	Connection for connecting auxiliary device (output signal)
5	BUS	Connection for eBus connectivity
6	POWER WIRE	-



07.18 – Impressed current anode + Magnesium anode

The exclusive impressed current anode (PROfessional TECh system solution) is an anodic anti-corrosion electronic protection system with a modulated current (24 V when power supplied, 12 V when functioning with batteries). It is located under H.E. cover as shown in picture. The electronic circuit creates a difference in potential between the boiler and the titanium electrode, so that optimal boiler protection is guaranteed, thereby preventing its corrosion.

The magnesium anode is intended as a “start-up” protection and is not necessary to replace it; in fact the permanent protection is ensured by electrically connected PRO-TECH anode. It is located inside the tank.

BEWARE! When the product is not supplied via power line, rechargeable batteries have to be used in order to guarantee right impressed current anode function.



Possible Errors (refer to troubleshooting par.):

- Impressed current anode: 241

07.19 – Refrigerant fluid R-134a

The heat transfer is materially effectuated by refrigerant fluid that circulates within the circuit.

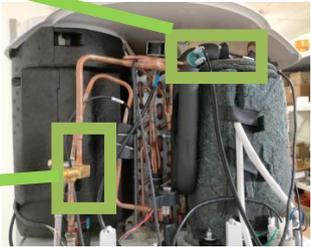
A refrigerant fluid has therefore the characteristic to absorb heat, evaporating at low temperature and, subsequently, gives this heat condensing to a temperature and pressure higher.

The refrigerant fluid circulates inside the close circuit by the action of the compressor.

According to the standard 34 ASHRAEs this fluid reenters in the category A1 and therefore it is not inflammable at environmental conditions of 1 bar and 18 °C. Anyway it is very dangerous to operate welds, braising or to expose to flames, to the product containing R134a.

It is forbidden to change the gas quantity inside the unit; in case of leakage suspicion, it's mandatory to empty the circuit, make the vacuum and a new charge in accordance with the quantity indicated on the technical label and following the instruction on relative section.

07.20 – “Service” valves

<p>There are two “service” valves.</p> <p>The first one is a low pressure side, useful for maintenance issues as: gas replacement, gas pressure check, vacuum.</p> <p>The second one is a high pressure side, useful for maintenance issues as: vuoto gas pressure check.</p>	<p>Low pressure service valve</p> 	
<p>High pressure service valve</p> 		

07.21 – Safety group and dielectric unions

<p>It is mandatory to fit a safety group onto the appliance’s water inlet pipe. The device must comply with the EN 1487 standard and must have a maximum pressure of 0,7 MPa (7 bar). Moreover, it must at least include the following components: a cut-off valve, a non-return valve, a control mechanism for the non-return valve, a safety valve and a water pressure shut-off device.</p>	
<p>The dielectric unions fitting with flat seal must be applied to the hot water outlet pipe. It needs to use it every time because defends the product to possible eddy current generated from product or connection between different materials. If sealing threads is used, flat seal is not required to use.</p>	

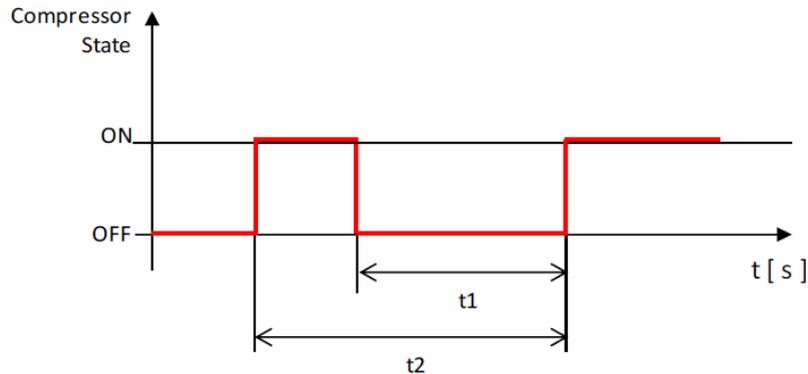
(*) The replacement of these components involves the emptying and the recharge of the circuit refrigerator. These operations must be effected exclusively by experienced personnel. It is mandatory to replace the dehydrator filter in any of these cases. During the assembling, respect the correct direction.

USE ONLY ORIGINAL SPARE PARTS.

08 – HEAT PUMP START-UP PROCEDURE

Compressor safety times:

- t1: this is the time that has to pass between an off condition and the following on condition, the minimum “rest” time (OFF time) is 4 minutes.
- t2=5 minutes: this is the time that has to pass between two on conditions,



Compressor shall be inhibited if:

- preheating phase is running (compressor shall be re-enabled as soon the temperature of NTCs of water are greater than water temperature +0,5°C)
- the tank temperature(*) is greater than the set point temperature.
- an error (volatile or not) occurs.
- passive DEFROST function is running
- Hysteresis zone appends
- $T_{high} > T_{HP} + 3^{\circ}C$
- TAIR out of range

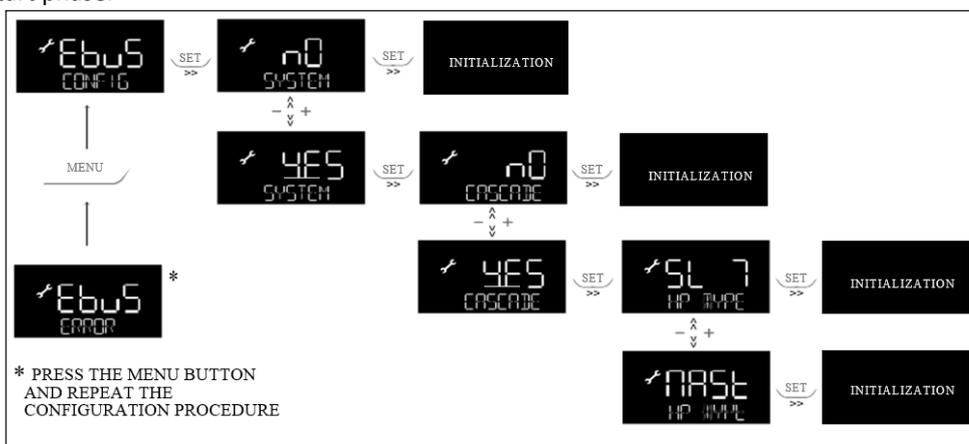
(*) tank temperature is calculated as the mean temperature of dome and middle probe.

Heat pump starting procedure shall control fan velocity together with compressor state depending on compressor safety times:

- t1 or t2 ≠ 0 : In this case fan shall start then it shall wait for t1 and t2 to get down to zero. After a hardware on/off condition t2 is already zero. As soon as t1 = t2 = 0 the compressor shall be switched on
- s t1 = t2 = 0: as compressor heating is requested, the compressor shall be switched on.

As soon as the product is supplied, during the first ignition, the display is turned on for few seconds (all icons and leds) then it enters and initialization phase necessary to recover settings information from the mainboard.

Set the SYSTEM and CASCADE parameters as indicated in dedicated paragraph (10.4 and 10.4.2) for correct installation on BUS during the start phase.



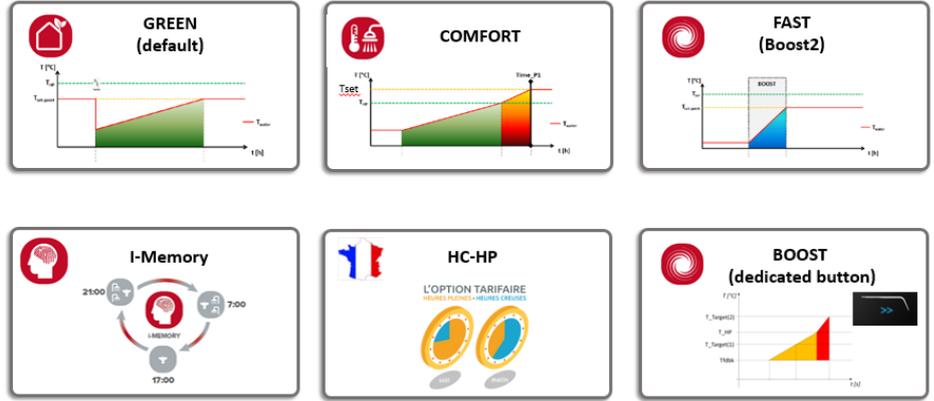
At the end of this initial configuration all icons are off and: shows “DISCOV” and “INIT” labels fixed. After this phase the product controls settings stored before power off and acts depending on it.

In particular the product will start in On mode by default from factory then the Off or On state will be saved in memory and restored after a power off. If the product is On as supplied it has to check if any errors occur, if time and date are available and if Wi-Fi module (if present) has never been configured and so on.

09 – FUNCTIONING MODES

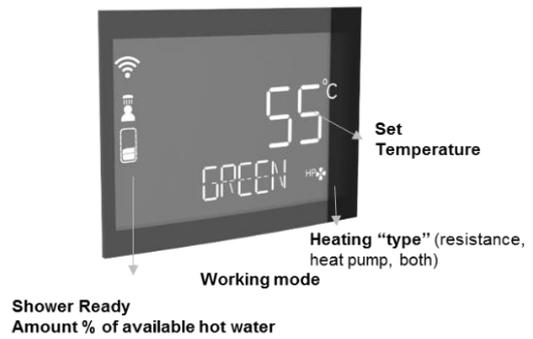
The operating modes available are:

- GREEN;
- COMFORT;
- FAST;
- BOOST;
- I-MEMORY;
- PROGRAM;
- HC-HP;
- HOLIDAY.



In normal operating conditions, the **MODE** button can be used to change the operating mode the water heater uses to reach the set temperature. The mode selected is indicated on the screen.

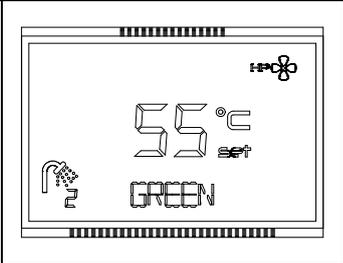
Rotating the encode, it is possible choose the T SET-POINT desire and for setting it pushing the encode. The T SET-POINT range depends to values of T MAX (P4) and T MIN (P5).



09.1 – GREEN mode

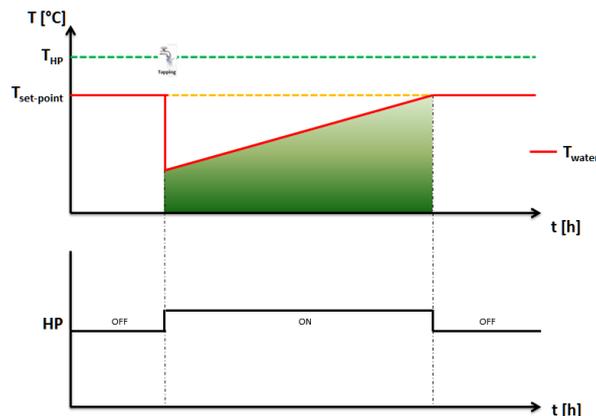
This mode is available by default and it is the starting working mode set by factory. The GREEN mode use only heat pump and shall be set in order to ensure energy saving; this function is recommended for air temperatures above 0°C during the hours of heating. The maximum water temperature achievable is 62°C. In case of work conditions out to heat pump standard, the integration guarantee the heating. The integration turn on always in the case of:

- Process of anti-legionnaire;
- Process of anti-freeze.



Useful parameters:

Parameter	Description/Functioning	Range	Default value
$T_{set-point}$	The desired temperature for the hot water can be set by turning the knob clockwise or anti-clockwise.	$T_{min} \div T_{HP}$	55 °C
$T_{W HP}$	Installer menu parameter P7 - Adjustment of the maximum temperature obtainable with the heat pump unit.	51 ÷ 62 °C	55 °C
T_{min}	Installer menu parameter P5 - Adjustment of the minimum obtainable temperature.	40 ÷ 50 °C	50 °C
T_{water}	The temperature of the water in the tank, to visualize press and release the knob; the relative value will appear for 8 seconds then the set temperature will reappear.	-	-



09.2 – COMFORT mode

In this mode the water heater reaches set temperature, through the rational use of the heat pump and, only if necessary, of the heating element. The priority is given to user comfort.

Target Temperature is given by comfort Temp.

Heating is performed with only **HP** until the **TMAX_HP (P7)** and **HE1+HE2*** above.

Max temperature achievable **75 °C** (adjustable P4 [65 – 75°C], 70°C by default)

If **Program Time (U2)** is active:

1. **HP only (700 W)** if the time to heat up the water is shorter than the time slot
2. **HP + HE1 (700 W + 1500 W)** if the time to heat up the water is longer than the time slot (up to max temperature of HP). Once the software re-estimate that the time is enough, HE1 is switched off.
3. **HE1+HE2 (1500+1000 W)** above the max temperature of HP

Pre-heating (priority is given to HP):

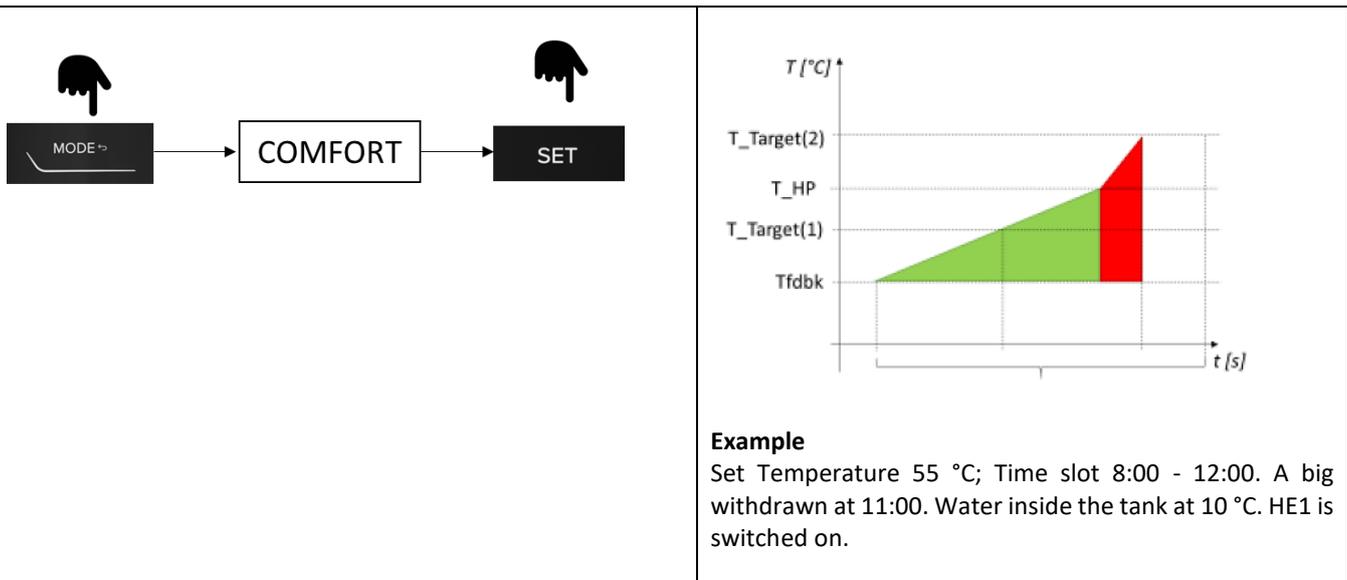
1. **HP only:** if $T_{set} < T_{MAX_HP}$ and time to pre-heat is enough
2. **HP + HE1:** if there is not enough time to pre-heat the water in HP only (e.g.: a big withdraw of the water 1 hour before the beginning of time slot)
3. **HE1+HE2:** if the set Temperature is higher than the T_{MAX_HP}

Heating element is activated for antibacterial cycle. Antibacterial temperature is the one chosen in parameter P3.

**Heating Element 1 = 1500 W*

**Heating Element 2 = 1000 W*

Double heating elements only available for Ariston and Elco



09.3 – FAST and BOOST mode

BOOST: by activating this mode (via the >> key), the water heater uses the heat pump and heating element simultaneously to reach the desired temperature in the shortest possible time. Once this temperature is reached, the system returns to the previous operating mode.

FAST: permanent boost mode, the water heater uses both heat pump and heating element to reach set temperature. The priority is given to heating time.

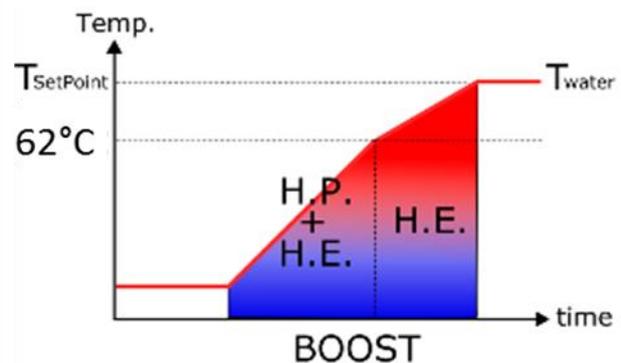
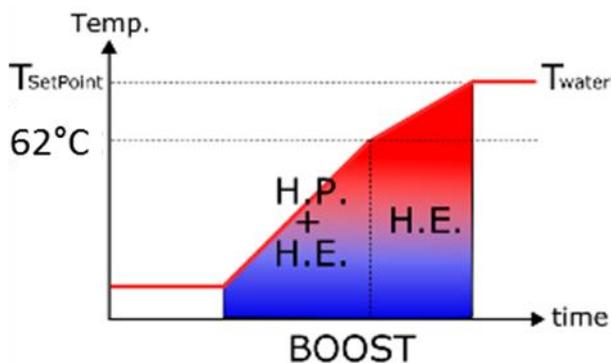


Case 1: $T_{\text{set-point}} \leq 62^\circ\text{C}$

	HP	HE
$T_{\text{water}} \leq 62^\circ\text{C}$	ON	ON

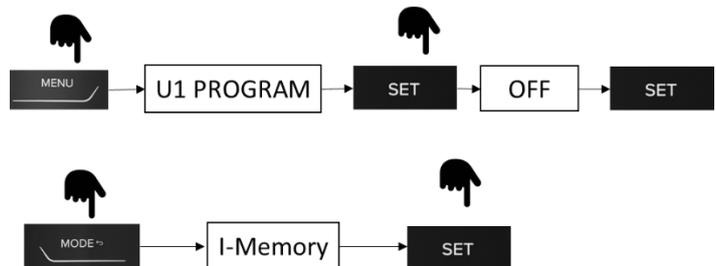
Case 2: $T_{\text{set-point}} > 62^\circ\text{C}$

	HP	HE
$T_{\text{water}} < 62^\circ\text{C}$	ON	ON
$62^\circ\text{C} < T_{\text{water}} < T_{\text{set-point}}$	OFF	ON



09.4 – i-MEMORY mode

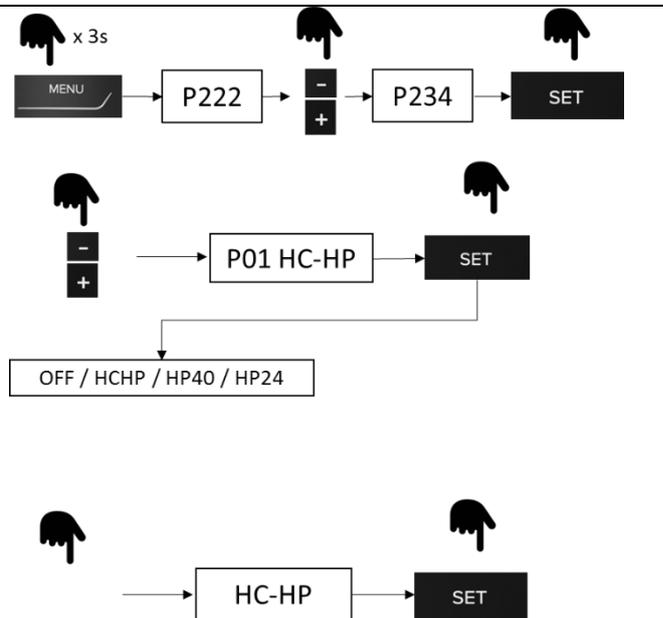
This mode is designed to optimize energy consumption and maximize comfort by monitoring the hot water needs of the user and the optimized use of the heat pump and the heating element. The algorithm guarantees each daily need by proposing the average of the profiles detected over the previous 4 weeks. In the first week of acquisition, the set point temperature entered by the user remain constant; from the second week onwards, the algorithm will automatically adjust the set point temperature to ensure daily needs. To reset the I-Memory profile use U9.



09.5 – HC-HP mode

To be activated by installer menu and visible when U1: PROGRAM is "OFF". Mode heating is performed within HC-HP signal detection in order to heat when low tariff energy is available. The target temperature and heating loads depend on the particular HC-HP mode selected. In particular:

- HC-HP, when signal EDF is detected HP and HE can work (priority is given to HP) Antifreeze protection is guaranteed all day long.
- HC-HP_40, when signal EDF is detected it works as HC-HP, otherwise temperature is maintained at 40 °C (HP only) all day long even outside HC-HP time slot.
- HC-HP24h, when signal EDF is detected it works as HC-HP, otherwise set temperature is achieved with HP only (min/max 40/62°C)



	EDF Signal	
	YES	NO
HCHP	As COMFORT	antifreeze
HP40	As COMFORT	40°C only HP
HP24	As COMFORT	HP always active

09.6 – HOLIDAY mode

This mode is to be used when a period of absence is scheduled after which the product has to automatically re-start to work according to previous setting. Holiday mode is set by User Menu. In this mode no heating is performed unless the antifreeze protection (if needed) or antibacterial cycle. Holiday mode auto deactivates as holiday days elapse and the mode previously active is re-entered.

09.7 – USER menu

To access the user menu, press “ **MENU** ”.

The word INFO will appear on the display. Press the “ + ” and “ - ” buttons to scroll the parameters U1, U2, U3 ... U10, the description of the parameter is shown in the line below. Once you have chosen the parameter press the “ **SET** ” button to select it. To go back to the parameter selection, press the “ **MODE** ” button.

PARAMETER	NAME	PARAMETER DESCRIPTION
U1	PROGRAM	It selects different operating modes PROGRAM ON - TIME BASED: GREEN, COMFORT, FAST PROGRAM OFF-ALWAYS ACTIVE: GREEN, COMFORT, FAST, AUTO, HC-HP
U2	PRGTIME	User can select the desired time slots.
U3	PRG SET	User can customize the time programming
U4	HOLIDAY	To activate/deactivate the HOLIDAY mode When On is confirmed the user has to enter the number of days of absence as “Holiday Days” [1, 99]
U5	ANTBACT	Activated/deactivated status of the anti-legion- naire’s disease function (on/off).
U6	DATE	To set the date (Year, Month, Day) and time (hours and minutes). User can enable/disable the auto switch among solar/legal hour.
U7	REPORTS	It displays energy consumption (total).
U8	SILENT	To enable/disable the SILENT mode (On/Off) Recommended for unducted installation.
U9	I-MRESET	To reset the delivery profiles select On and press the SET button. The data saved in the memory is deleted and the learning starts from the current week.
U10	WIFI RS	WHERE AVAILABLE To reset the Wi-Fi data, select On and press the SET button.

TIME SCHEDULING

U2 PRGTIME parameter.

The user can set 4 different time slots for each day of the week in the operating modes GREEN, COMFORT e FAST.

[START] and [STOP] define the beginning and the end of a time slot.

After the fourth time slot, to reset the time slot selected and the ones after, press “ - ” until “OFF” is displayed and then press “SET”. If a time slot is not set it remains as not defined.

Example: the water heating system is active from 8 am to 12 pm and from 4 pm to 8 pm.

[START1] = 8:00; [STOP1] = 12:00;

[START2] = 16:00; [STOP2] = 20:00;

[START3] = 00:00; [STOP3] = 00:00;

[START4] = 00:00; [STOP4] = 00:00;

If ALL_DAYS is selected the same time slots are assigned from Monday to Sunday. Then each day of the week can be customized one by one, selecting the corresponding parameter. Therefore, each day of the week can be customised one by one by selecting the corresponding parameter. Warning: if the selected time period is too short, the desired temperature may not be reached.

PROGRAM SETTINGS

U3 PRG SET parameter. Program Setting allows to customize the different working modes when U1 is ON.

PARAMETER	NAME	PARAMETER DESCRIPTION
U3.1	T MIN	Beyond the timeslot, a minimum water temperature is guaranteed. Heat pump to pre-heat water: the set temperature is reached at the beginning of the selected time slots.
U3.2	PREHEAT	Heat Pump pre-heat the water: set temperature is already achieved at the beginning of the selected time slots

09.8 – PROGRAM mode

To be able to set PROGRAM mode n.3 parameters must be defined:

1. Parameter U1 PROGRAM: It allows the user to select the kind of domestic hot water comfort desired:

PROGRAM ON	TIME BASED	GREEN, COMFORT, FAST
PROGRAM OFF	ALWAYS ACTIVE	GREEN, COMFORT, FAST, AUTO, HC-HP

2. Parameter U2 PRGTIME: It allows user to select desired time slots
3. Parameter U3 PRG SET: It allows the user to customize the time programming

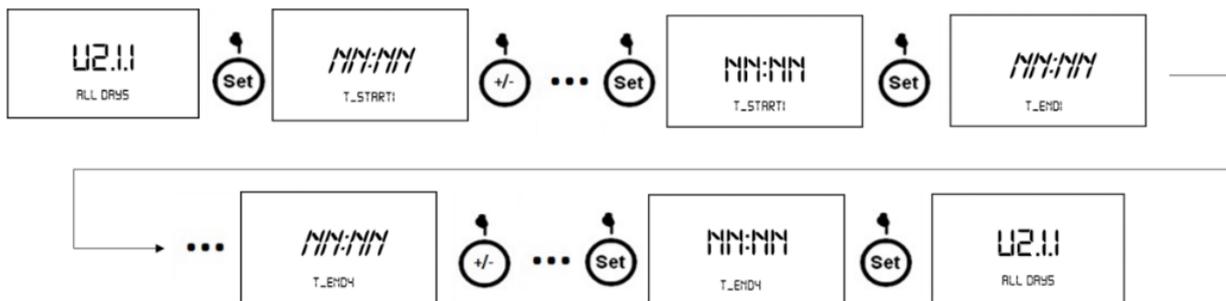
When PROGRAM 1 is ON, one of the following mode can be used:

- GREEN, COMFORT or FAST.

You can set 4 different time slots for each day of the week using the parameter PRGTIME U2.

If ALL_DAYS is selected the same time slots are assigned from Monday to Sunday, elsewhere time slots can be customized singularly for each day of the week selecting the corresponding parameter.

If a time slot is not set it remains as not defined.



The programming submenu allows the customer to set different programming settings.

Parameter	Name	Parameter description
U3.1	T MIN	It allows the user to set the minimum temperature that has to be guaranteed outside the selected time slots.
U3.2	PREHEAT	Set temperature is already achieved at the beginning of the selected time slots

09.9 – INSTALLER menu

Main settings can be modified in the installer menu.
Press MENU for 3 seconds to enter in the installer menu.
Select password **234** to enter the installer menu.

MENU

Use [PLUS]/[MINUS] to navigate in the installer menu.
The parameter is selected by pressing the [SET] button.



Parameter	Name	Parameter description	
		Value	Description
P1	HC-HP	0 (HC-HP_OFF)	HC-HP mode disabled (default)
		1 (HC-HP)	HC-HP mode enabled (standard HC-HP mode)
		2 (HC-HP_40)	HC-HP_40 mode enabled
		3 (HC-HP24h)	HC-HP24h mode enabled
P2	ANTIBACT	Antibact enabling has to be set Off/On (Off by default) if the user wants to disable/enable the antibacterial function. T Antibact gives the temperature to achieve with the antibacterial cycle and maintains it for 1 hour at least.	
P3	T ANTB		
P4	SET MAX		
P5	SET MIN	These parameters have to be set to change the allowed range of Comfort Temp. They can be set by the installer in the [65, 75°C] range.	
P6	I-M TMIN	Minimum temperature that has to be guaranteed to the final user in I-Memory mode when no tapings have been detected on that time slot on previous week	
P7	TMAX HP	Maximum water temperature that can be achieved with the heat pump only. It can be set by the installer in the [40 / 62 °C] range.	
P8	TMINAIR	Minimum air temperature that ensures the heat pump working; if air temperature goes below this value the compressor is inhibited. It can be set by the installer in the [-10, 10°C] range	
P9	HYST HP	Hysteresis value that allows the heat pump to restart after having achieved the target temperature. It can be set by the installer in the [3 / 12°C] range.	
P10	TANKVOL	This parameter gives the capacity of the tank; it is set automatically by the EOL machine but it has to be available in case of spare part customization.	
P11	PV MODE	Value	Description
		0 (OFF)	PV mode disabled (default)
		1 (PV_HP)	PV mode with HP only
		2 (PV_HE)	PV mode with HP and HE1
		3 (PV_HEHP)	PV mode with HP and HE1+HE2
P12	PV TSET	This parameter gives the temperature to be achieved in PV mode. It can be set by the installer in the [55 / 75 °C] range.	
P13	SG MODE	Value	Description
		0 (OFF)	SG mode disabled (default)
		1 (HP_ON)	SG mode with HP only
P14	SYSMODE	Value	Description
		0 (Sdt)	The product is configured to work alone (no devices on Ebus2 a part form SENSYS)
		1 (Out)	The product is configured to work with an auxiliary load driven by AUX direct contact (no devices on Ebus2 a part form SENSYS)

			2 (Prhe)	The product is configured to work connected to eBus2 as DHW pre-heater	
			3 (SYS)	The product is configured to work connected to eBus2 as master of DHW service	
P15	BUZZER	Buzzer enabling has to be set Off/On (On by default) if the user wants to disable/enable the buzzer beep at buttons pressure.			
P16	SILENT	This parameter has to be set On/Off (Off by default) if the user wants to enable/disable the silent mode			
P17	CHARGE	Activation of the cycle inversion procedure, to allow the gas charging (see paragraph 4.9) (activate this only in presence of mains alimentation).			
P18	FACT RS	This command has to be set if the installer wants to resume the factory settings configuration; all user settings will be re-set at default value with the only exception of energy statistics, tank volume and Wi-Fi.			
P19	MB SW	This parameter gives the HP-TOP-MB software version as MM.mm.bb.			
P20	HMI S	This parameter gives the HP-MED-HMI software version as MM.mm.bb.			
P21	T LOW	This parameter gives the water temperature in °C read by the NTC placed at low position in the water tank. If the NTC is in error "--" is shown.			
P22	T HIGH	This parameter gives the water temperature in °C read by the NTC placed at high position in the water tank. If the NTC is in error "--" is shown.			
P23	T DOME	This parameter gives the water temperature in °C read by the NTC placed at dome position in the water tank. If the NTC is in error "--" is shown.			
P24	T AIR	This parameter gives the air temperature in °C read by the NTC placed on the outside unit. If the NTC is in error "--" is shown.			
P25	T EVAP	This parameter gives the gas temperature in °C read by the NTC placed before the evaporator on the outside unit. If the NTC is in error "--" is shown.			
P26	T SUCT	This parameter gives the gas temperature in °C read by the NTC placed before the compressor on the outside unit. If the NTC is in error "--" is shown.			
P27	T COND	This parameter gives the gas temperature in °C read by the NTC placed after the condenser on the outside unit. If the NTC is in error "--" is shown.			
P28	T DISC	This parameter gives the gas temperature in °C read by the NTC placed after the compressor on the outside unit. If the NTC is in error "--" is shown.			
P29	T SH	This parameter gives the superheating temperature in °C. If the NTC evap or suction are in error "-" is shown			
P30	ERRORS	This parameter allows navigation among last 10 errors that occurred.			
P31	WI-FISET	This parameter allows to switch the product from a WiFi model (On) or not (Off).			
P32	F ANTB	Repetition every [1-30] days for the antibacterial cycle if active.			
P33	EBUS POWER	ON (function enabled) - OFF (function disabled)			
P34	HP-TYPE	Cascade setting [Master-Slave1,.....Slave7]			

The Appliance is manufactured with a series of default modes, functions or values, as indicated in the table below:

Parameter	Factory default setting
WORKING MODE	GREEN
DEFAULT SET TEMPERATURE	55 °C
MAX. TEMPERATURE SETTABLE WITH THE HEATING ELEMENT*	75 °C
MINIMUM SETTABLE TEMPERATURE*	40 °C
MAX. TEMPERATURE SETTABLE WITH THE HEAT PUMP	62 °C
ANTI-LEGIONNAIRE'S DISEASE PROTECTION	DEACTIVATED
HOLIDAY MODE	DEACTIVATED
DEFROST (active defrost activation)	ACTIVATED
HC-HP (two-tier rate operation mode)	DEACTIVATED
HYSTERESIS HP	12°C (**)

*To vary the temperature range use P4 and P5 in the installer menu.

** Heating Element Hysteresis is adjustable with P9 parameter and equals to 12°C.

10 – FUNCTION MANAGEMENT

10.1 – P14 parameter

The P14 parameter “SYSMODE” allows to choose how system has to operate:

- 0. STD

The product is configured to operate as standard installation.

- 1. OUT

The product is configured to operate with a coil auxiliary load controlled by the direct AUX contact.

AUX contact is used instead of heating element (except for PV and SG switched ON where the heating element is functioning).

- 2. PRHE

The product is configured as a generator in pre-heating to operate as auxiliary load and share the domestic hot water parameters (only on eBus2 system otherwise it will work as standard mode).

Refer to the paragraph 10.4.1 and to the 2.C installation where the heat pump water heater is in pre-heating of combined heating generator (boiler or combi hybrid).

- 3. SYS

The product is configured to operate with a coil auxiliary load controlled via BUS.

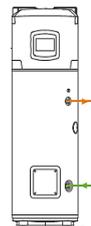
Refer to the paragraph 10.4.1 and to the 2.B where the heat pump water heater is with auxiliary generator (boiler and/or solar system) with coil.

It is effective only on eBus2 system and in case of Ariston Thermo heat generator as the above 2.B otherwise it will work as standard mode.

With this function the Ariston Thermo heat generator is used instead of heating element (except for PV and SG switched ON, where the heating element is functioning).

10.1.1 - STD

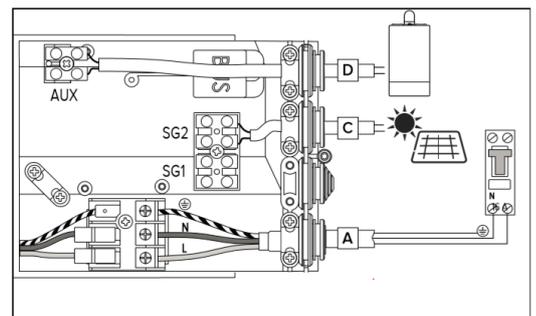
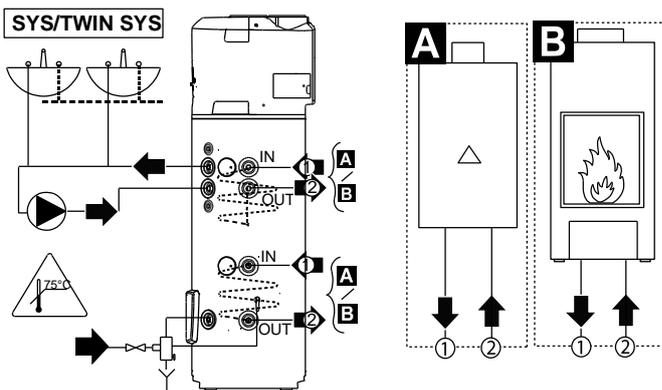
The product is configured to operate as standard installation.



10.1.2 - OUT

This configuration is advised when it is available auxiliary heat generator (i.e. system boiler) which is able to replace the electrical resistance for integration function (only for SYS and TWIN SYS models).

In this way, the integration is performed by the external auxiliary heat generator which has to be correctly connected both hydraulically (refer to below left picture) and electronically on AUX contact (refer to below right picture) to the product.

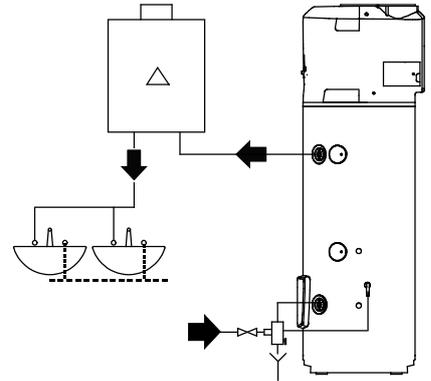


10.1.3 - PRHE

This configuration is advised to perform a pre-heating of inlet water to a combi boiler made by the heat pump.

The product is configured as a generator in pre-heating to operate as auxiliary load and share the domestic hot water parameters (only on eBus2 system otherwise it will work as standard mode).

Refer to the paragraph 10.4.1 and to the 2.C installation where the heat pump water heater is in pre-heating of combined heating generator (boiler or combi hybrid).

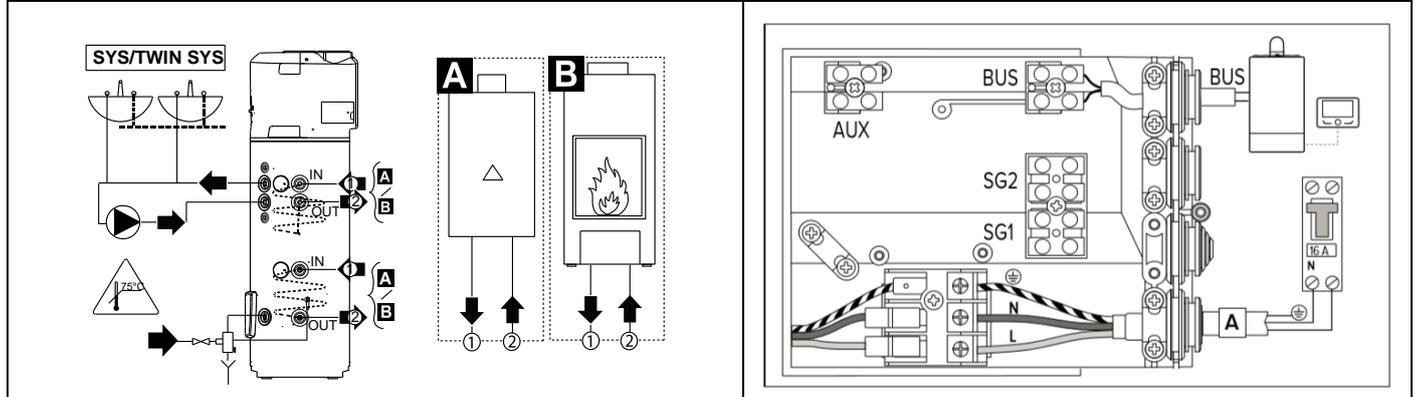


10.1.4 - SYS

This configuration is advised when it is available auxiliary heat generator (i.e. system boiler) which is able to replace the electrical resistance for integration function (only for SYS and TWIN SYS models).

In this way, the integration is performed by the external auxiliary heat generator which has to be correctly connected both hydraulically (refer to below left picture) and electronically on the BUS connector (refer to below right picture) of the product.

Concerning electrical connection and referring to second picture, it needs to be connected on the BUS.



10.1.5 - SYS and TWIN SYS STANDARD APPLICATION

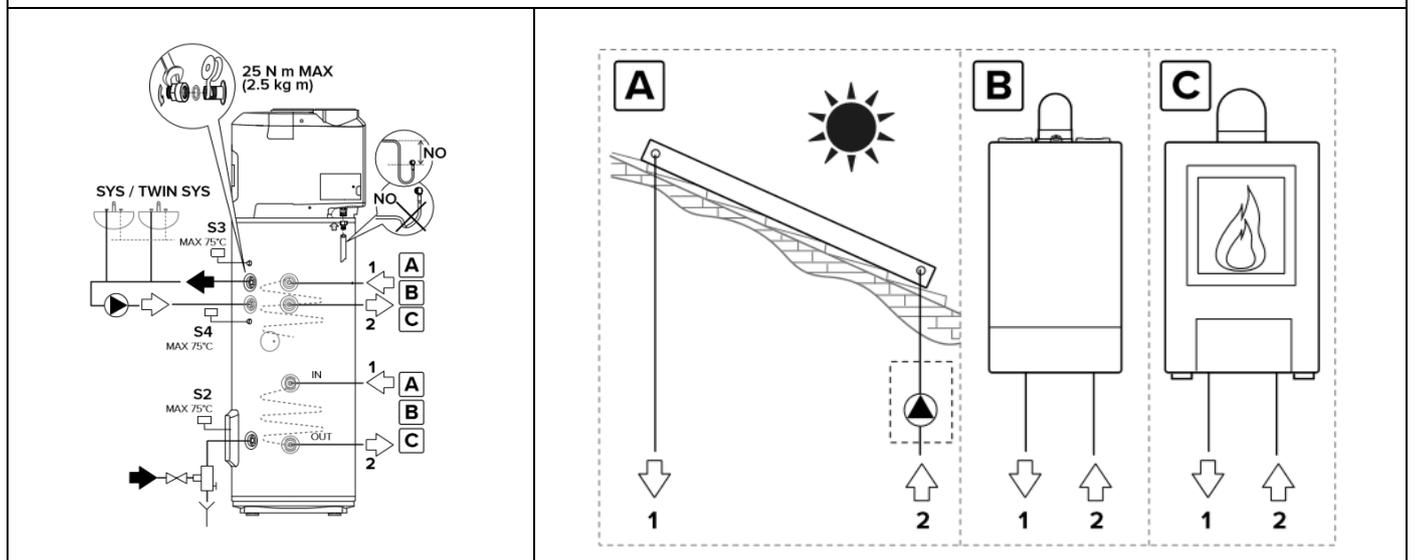
SYS and TWIN SYS model are equipped with sensor slots that can be used from external devices, if needed.

Both SYS and TWIN SYS have no. 1 common slot on flange plate.

The other slot/slots are close to the coils. Generally speaking the models are following this rule:

- SYS model has in total 2 sensor slots;
- TWIN SYS model has in total 3 sensor slots.

The related temperature probes are not provided with the product.



10.2 – PV function (P11 parameter)



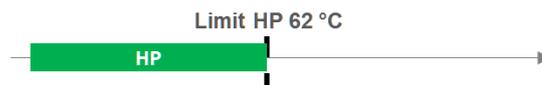
This parameter could be useful when it is available a photovoltaic system and optimise use of the electricity produced.

After having done the electrical connections as described in above paragraphs and setted the P11 parameter to other than "0".

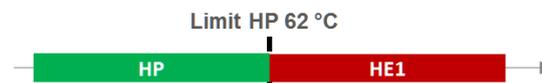
The signal should be received at least for 5 minutes to enable the photovoltaic function (once the product starts a cycle, it will operate for at least 30 minutes).

When the signal "SIG" is detected, the operating mode works as follow.

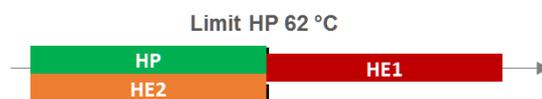
- OFF (value 0 – default): the operating mode of the previously described procedures is not modified (PV mode disabled);
- PV_HP (value 1): the PV icon is displayed, when the signal is present. The product will reach the set temperature (the highest between T SET POINT and PV TSET) with only the heat pump (max 62°C);



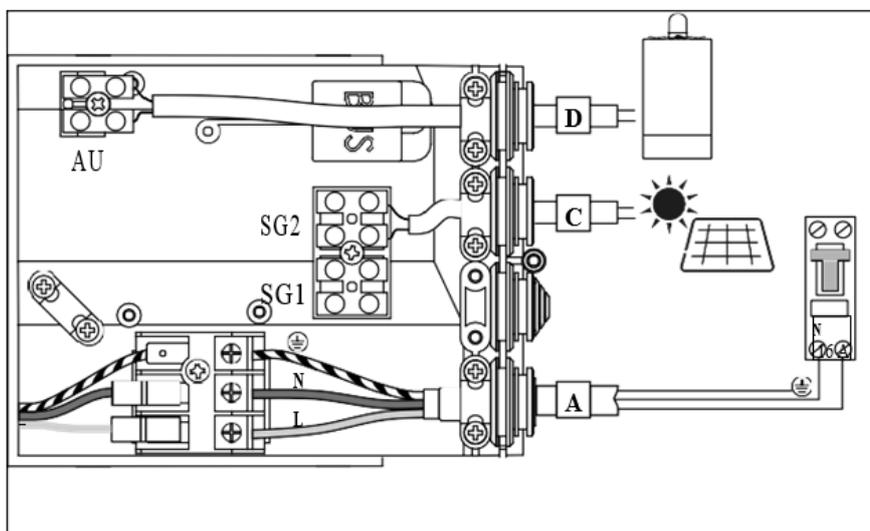
- PV_HE (value 2): the PV icon is displayed, so the name of the selected mode alternates with the text PV HE. The product will reach the set temperature (the highest between T SET POINT and PV TSET) operating with only the heat pump up to 62°C and if needed with the heating element (1500 W);



- PV_HEHP (value 3): the PV icon is displayed, when the signal is present and the name of the selected mode alternates with the text PV HE HP. Settled temperature (the highest between TSET POINT and TW PV) is achieved with the heat pump and the heating element (1000 W) up to 62°C. For higher Temperatures than 62 °C the second heating element (1500 W) is activated. There must be the SIG2 signal for at least 5 minutes to enable the photovoltaic function (once the product starts a cycle, it will operate for at least 30 minutes).



Make following connection (PV signal is 230V):



If you have a PV system to be connected or an SG signal available, you can connect a bipolar cable from the inverter or the SG signal cable (alternatively, not both) to the connection box (secure the cable into the dedicated cabling sheath).

Connect this cable (C) to the connector called "SIG2" and activate the PV (P11) or SG (P13) function via the installer menu.

WARNING: signal 230 V.

Only for SYS or TWIN SYS models, if you have an auxiliary heat generator (e.g. boiler) and you would like to use it instead of the integration carried out by the heating element, you can connect a bipolar cable (D) from the heat generator (if provided) to the product connection box (secure the cable into the dedicated cabling sheath).

Connect the cable to the connector called "AUX" and set the P14 parameter to 1 via the installer menu.

If you connect the SYS version to the boiler/stove, it is advisable to use upper sensor slot S3.

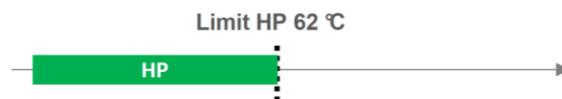
If you connect the TWIN SYS version to the boiler/stove, it is advisable to use sensor slot S4 for the lower heat exchanger and S3 for the upper one).

If you connect the SYS or TWIN SYS versions to the solar control unit (lower heat exchanger), you can use the lower sensor slot on its own (S2) or both sensor slots (S2) and (S3/S4).

10.3 – SG function (P13 parameter)

If you have an SG signal, you can connect the signal cable as described in the "electrical connections" chapter when the function P13 is enabled the SG icon will be displayed.

Once the SIG2 signal has been received for at least 5 minutes (once the product starts a cycle, it will work for at least 30 minutes), the name of the selected mode alternates with the text SG ON and the current operating mode is automatically changed by thermostating the product at set temperature (the maximum between T SET POINT and PV TSET), operating only with the heat pump (max 62 °C).



10.4 – BUS connection

This product is compatible with Bus BridgeNet®.

As soon as the product is supplied, the display is turned on for few seconds (all icons and leds) then it enters an initialization phase necessary to recover settings information from the mainboard.

Set the SYSTEM and CASCADE parameters as indicated below for correct installation on BUS during the start phase:

- **SYSTEM = NO**

The product is not connected on BUS or is only connected to a remote control.

- **SYSTEM = YES Cascade = NO**

The product is installed on a system on bus with other compatible heat generators (solar heating, boiler, hybrid system or heat pump), at least one of which is powering the BUS. In presence of a Wi-Fi gateway on BUS (installed on remote control or on heat generator), the heating and domestic hot water services can be managed via a single app for smartphones.

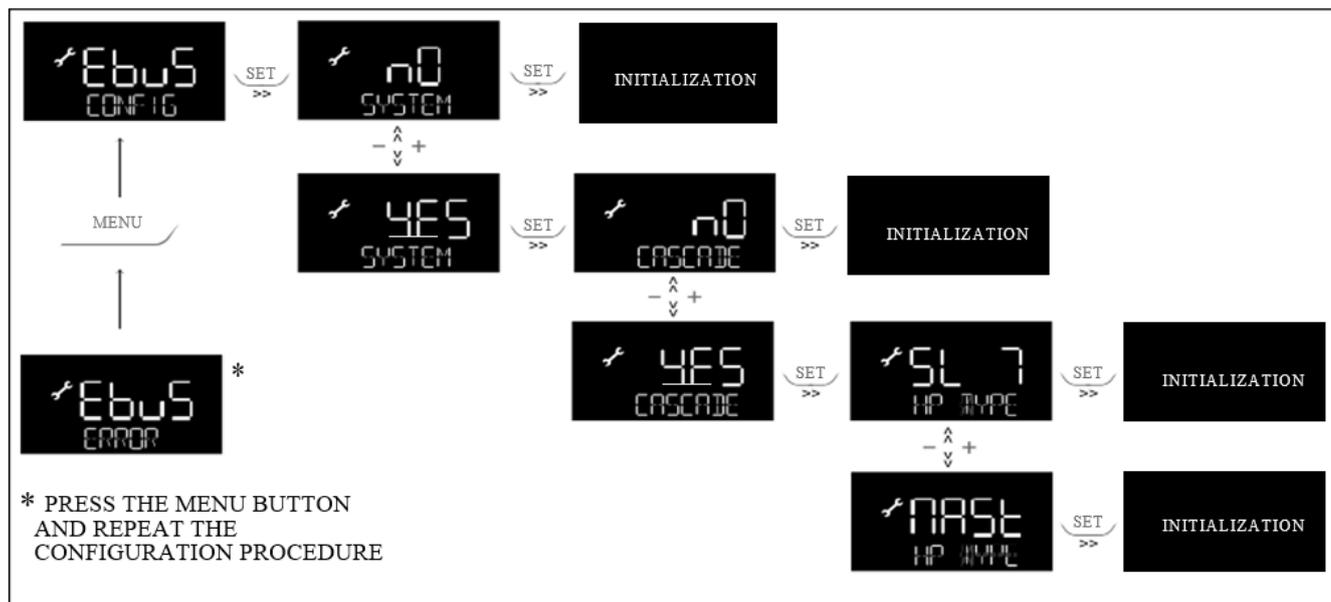
- **SYSTEM = YES Cascade = YES**

The product is installed on a cascade system (max 8) for commercial or collective use. After setting the CASCADE option, confirm whether the product is the MASTER or one of the cascade SLAVES. The BUS allows you to align all the user operating parameters on the MASTER product with those on the SLAVE products.

The SYSTEM and CASCADE parameters affect the P33 and P34 parameters of the installer menu.

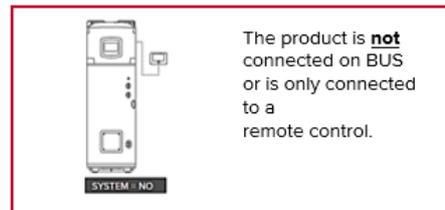
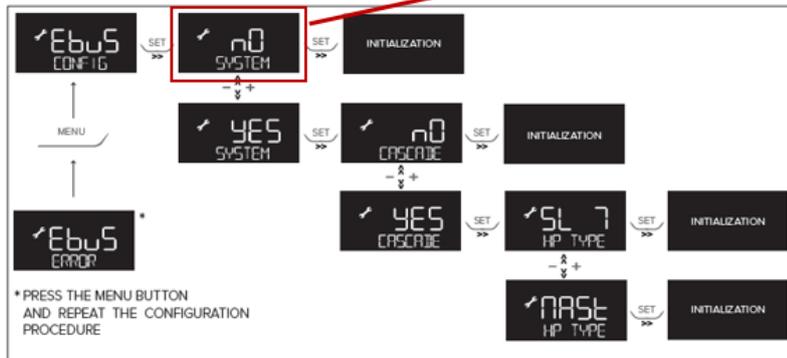
If the product is enabled to work on BUS in order to avoid risks of a power overload, the product will not power the BUS (P33 parameter of the installer menu set to OFF), except for when the product is a cascade MASTER. It is therefore necessary to have at least another generator which powers the BUS to complete the start phase.

When the product is installed on BUS, all the parameters for the management of domestic hot water, its special parameters and the system parameters are shared with all other products, allowing you to use just one remote control.

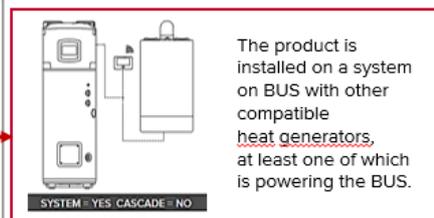
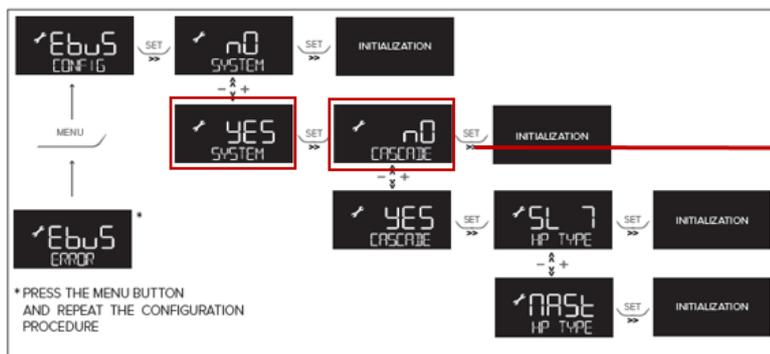


At this point there might be different installation scenario.

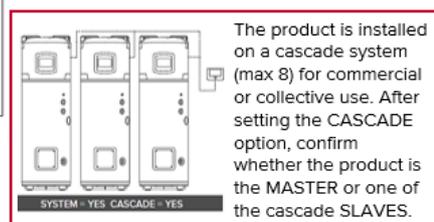
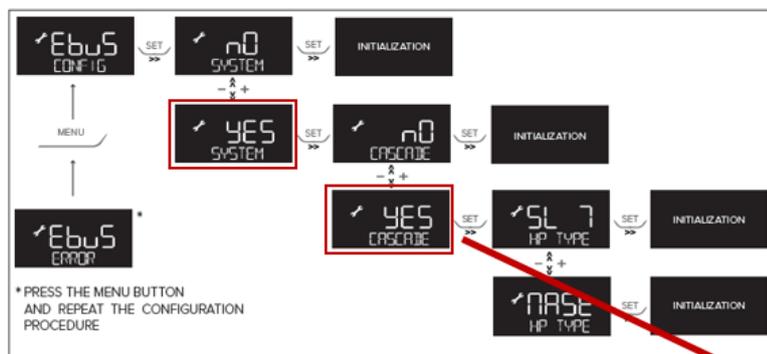
- 1) When the product is not connected on BUS or is only connected to a remote control.



- 2) The product is installed on a system on BUS with other compatible heat generators, at least one of which is powering the BUS.



- 3) The product is installed on a cascade system (max 8) for commercial or collective use. After setting the CASCADE option, confirm whether the product is the MASTER or one of the cascade SLAVES.



At the end of this initial configuration all icons are off and: shows "DISCOV" and "INIT" labels fixed.

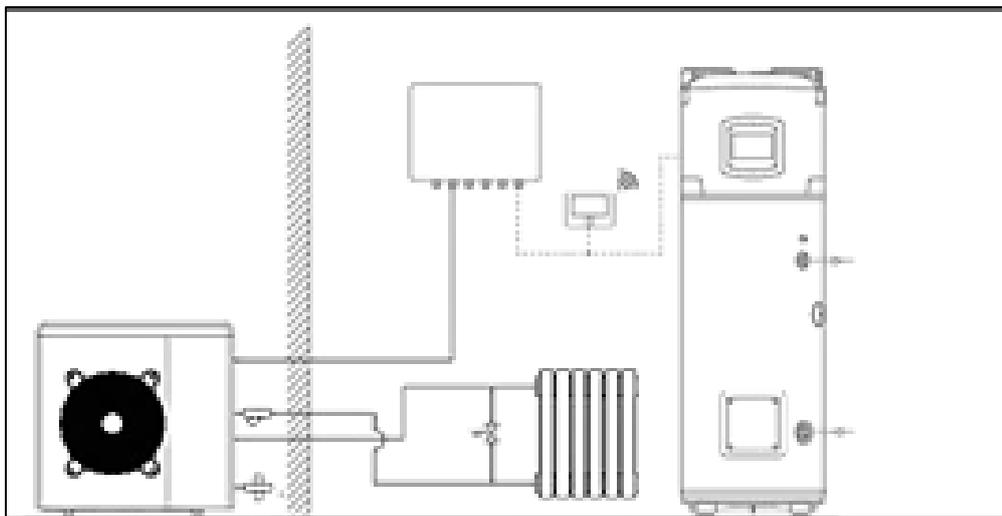
After this phase the product controls settings stored before power off and acts depending on it. In particular the product will start in On mode by default from factory then the Off or On state will be saved in memory and restored after a power off. If the product is On as supplied it has to check if any errors occur, if time and date are available and if Wi-Fi module (if present) has never been configured and so on.

10.4.1– Installations types with other heat generators

2) Within the previous configuration no. 2 (where the product is installed on a system on BUS with other compatible heat generators, at least one of which is powering the BUS) is possible to have several kind of integration as the ones below.

2.A) Heat pump water heater and separate heat generator (boiler, heat pump or hybrid system).

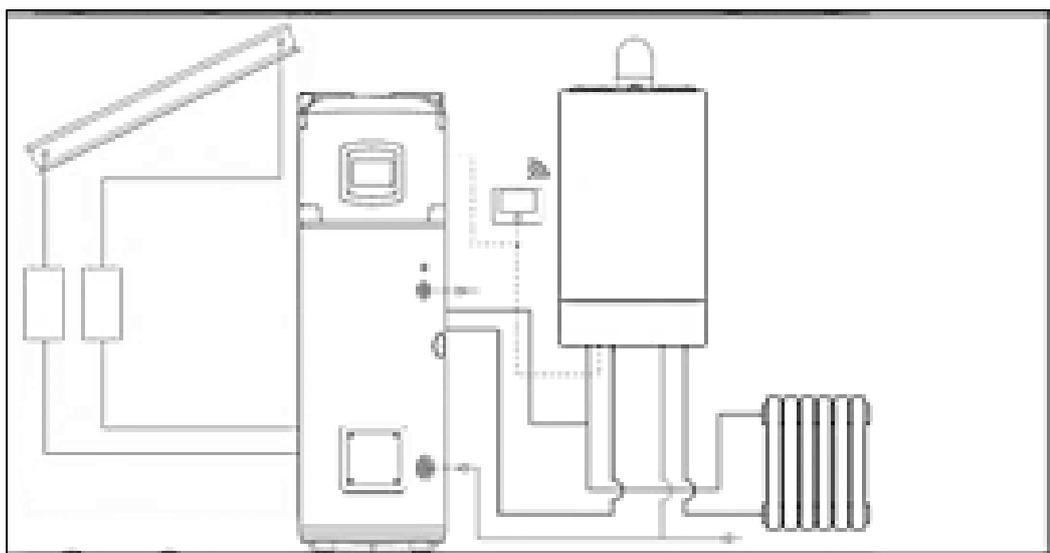
The products have no integration but can be managed via a single remote control.



Scheme	HPWH	WHB			HYB	PCM	
	Par 33.3.0 - Hydraulic Scheme	Par. 2.0.1 - DHW preheating	Par 2.2.7 - Boiler Hybrid	Par. 2.2.8 - Boiler version	Par 12.2.0 - Hydraulic scheme	Par. 17.2.0 - Hydraulic scheme	Par. 17.5.9 - Light Box DHW Disable
2A: HPWH Stand Alone + WHB	0 (Stand Alone)	0 (OFF)	0 (Disabled)	2 (Storage with Thermostat)			
2A: HPWH Stand Alone + HYB	0 (Stand Alone)	0 (OFF)	1 (Enabled)	2 (Storage with Thermostat)	2 (WHB + tank)		
2A: HPWH Stand Alone + PCM	0 (Stand Alone)					5 (Light Box)	1 (ON)
2A: HPWH Stand Alone + PCM	0 (Stand Alone)					1 (Plus)	Not available

2.B) Heat pump water heater with auxiliary generator (boiler and/or solar system) with coil.

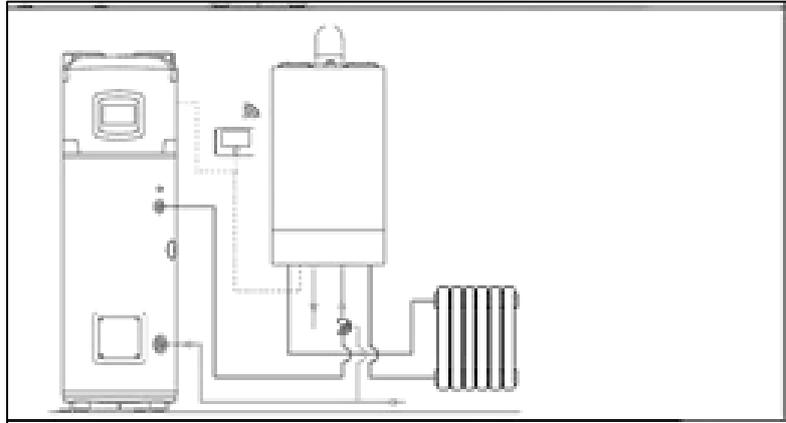
If the system is installed with a boiler acting as a support generator, in order for the heat pump water heater to call the boiler as opposed to the heating element via the BUS, you must set the P14 parameter to value 3 (consult INSTALLER MENU section). Unless otherwise specified in the auxiliary generator manual, the auxiliary generator does not read the water heater sensors; therefore additional sensors are required depending on the hydraulic circuit diagram.



Scheme	HPWH	WHB	SML
	Par 33.3.0 - Hydraulic Scheme		
2B: HPWH (Sys) + WHB + SML	3 (Sys)	0 (Disabled)	1 (Single Coil)

2.C) Heat pump water heater in pre-heating of combined heating generator (boiler or combi hybrid).

In order to enable the pre-heating management on the domestic hot water service, set the P14 parameter to 2. In this installation, the water heater and the combi generator share the same DHW temperature setting. The water heater temperature can be reduced in pre-set time slots using the T MIN parameter or increased using the PV SET parameter if there is a photovoltaic system. The combi generator does not read the sensors of the water heater. Additional sensors are required, depending on the hydraulic circuit diagram.



	HPWH	WHB			HYB	SML
	Par 33.3.0 - Hydraulic Scheme	Par. 2.0.1 - DHW preheating	Par 2.2.7 - Boiler Hybrid	Par. 2.2.8 - Boiler version	Par 12.2.0 - Hydraulic scheme	Par 3.2.1 - Hydraulic scheme
Scheme						
2C: HPWH (Pre-Heat) + WHB + SML	2 (Pre-Heat)	0 (OFF)	0 (Disabled)	0 - (Combi)		1 (Single Coil)
2C: HPWH (Pre-Heat) + WHB + HYB + SML	2 (Pre-Heat)	0 (OFF)	1 (Enabled)	0 - (Combi)	1 (WHB Combi)	1 (Single Coil)

3) Further scenario is the CASCADE installation (where the product is installed on a cascade system for commercial or collective use).

«Cascades» means a group of Nuos Plus (up to 8 as maximum) which work in **parallel**.

The main goal is to have **only one input** for all the product in parallel.

When they are installed in parallel, **there is no any energy management algorithm**.

Cascade can be connected even **without sensys**.

If the installer connects all the Nuos Plus through the Ebus (up to 8) one product will be the «Master» while the others will be «Slaves». Using the HMI of the master, inputs will be shared with all the product in the cascade systems



LOGICAL SCHEME	SERVICES	DETAILED SCHEME	Sensys	Sensys 2.0	App ARISTON AQUA	App HEA ARISTON NET/ CHAFFOTEAU X/ ELCO	Nuos installer parameters and error log on web app for Service
A. NUOS stand-alone	Water Heating only	NUOS STAND-ALONE	OK V 07.04.07	OK	available		
B.1. NUOS + separate heating system, no hydraulic integration	Heating + Water Heating	NUOS + HHP	OK V 07.04.07	OK	available	available	available
		NUOS + SYS BOILER	OK V 07.04.07	OK	available	available	available
		NUOS + SYS HYB BOILER	OK V 07.04.07	OK	available	available	available
B.2 Hydraulic integration on DHW through coil (SYS/TWIN SYS)	Heating + Water Heating	NUOS SYS + SYS BOILER	OK V 07.04.07	OK	available	available	available
		NUOS TWIN SYS + SOLAR + SYS BOILER	OK V 07.04.07	Ok	available	available	available
B.3. Hydraulic integration on DHW with Nuos in pre-heating of combi generator	Heating + Water Heating	NUOS SYS + SOLAR	OK V 07.04.07	Ok	available		
			NUOS + COMBI BOILER	OK V 07.04.07	OK		available
		NUOS + COMBI HYB BOILER	OK V 07.04.07	OK		available	available
C. Cascades	Water Heating only	NUOS CASCADE		Ok			

10.4.2 – SENSYS interface and connectivity



Line 1	Date and hour
Line 2	Daily program
Line 3	Operation Mode and setpoint temperature
Line 4	Heating element HP and DHW program
Line 5	come back to menu

10.4.3 – SENSYS USER menu

SYSTEM OPERATION MODE	
Summer	OFF
COMPLETE MENU	
DOMESTIC HOT WATER SETTINGS	
<i>DHW comfort setpoint temperature</i>	
<i>Time Programming</i>	
Domestic Hot Water Program	
- Set Comfort T	
- Set Reduced T	
- Set Time Prog	
- DHW Pre-heating	
<i>Auxiliary Timer</i>	
- Set Comfort T	
<i>Comfort function</i>	
- Disabled	
- Time Based	
- Always Active	
<i>Thermal cleanse function</i>	
- Thermal cleanse function	
- Thermal Cleanse target temp	
<i>Operation mode</i>	
- Green	
- Comfort	
- Fast	
- I-memory	
- HC-HP	
<i>Domestic Hot Water BOOST</i>	
- OFF	
- ON	
Holiday Function	
- OFF	
- ON	
SPECIAL MODE	
<i>HPWH Quiet Mode Activation</i>	
- OFF	
- ON	
<i>PV setpoint temp.</i>	
SYSTEM PERFORMANCES	
<i>Energy Metering</i>	
Consumptions history	
- DHW	
<i>DHW temperature (T dome) (non disponible)</i>	

10.4.4 – SENSYS INSTALLER menu

The following focus on SENSYS INSTALLER menu is applicable from NEW Software version: 07.04.07.

MENU HPWH	MENU	SUB-MENU	PARAMETER	DESCRIPTION	RANGE
	33			HPWH Parameters	
	33	0		User parameters	
MODE	33	0	0	Operation Mode	0. Green 1. Comfort 2. Fast 3. I-memory 4. HC - HP
P16 U8	33	0	1	Quiet Mode	OFF - ON
P15	33	0	2	Acoustic touch feedback	OFF - ON
>>	33	0	3	Domestic hot water boost	OFF - ON
U3.2	33	0	4	DHW preheating	OFF - ON
	33	1		Advanced settings	
P10	33	1	0	Tank capacity	
P6	33	1	1	I - memory comfort temperature	
P8	33	1	2	Min temperature air HP	
P7	33	1	3	Max temperature HP	
P9	33	1	4	Hyst temperature HP	
	33	2		Input output configuration	
P1	33	2	0	HC - HP mode	0. OFF 1. HC - HP 2. HC - HP 40 3. HC - HP 24h
P11	33	2	1	Photovoltaic integration	0. OFF 1. Heat Pump 2. HP + HE1 3. HP + HE1 + HE2
P12	33	2	2	PV setpoint temperature	
P13	33	2	3	SG mode	OFF - ON
	33	3		System settings	
P14	33	3	0	Hydraulic scheme	0. Only HP 1. Auxiliary 2. Preheater 3. HP system
	33	4		Domestic Hot Water	
+ / -	33	4	0	DHW comfort setpoint temp.	
U3.1	33	4	1	DHW reduced setpoint temp.	
P4	33	4	2	Max T	
P5	33	4	3	Min T	
U1	33	4	4	Comfort Function	0. Disabled 1. Time based 2. Always active
P1	33	4	5	Max heating time	
P2 U5	33	4	6	Thermal cleanse function	OFF - ON

MENU HP/WH	MENU	SUB-MENU	PARAMETER	DESCRIPTION	RANGE
P3	33	4	7	Thermal Cleanse target temp	
	33	6		Statistics - 1	
	33	6	0	HP running hours (h/10)	
	33	6	1	Resistor 1 running hours (h/10)	
	33	6	2	Resistor 2 running hours (h/10)	
	33	6	3	HP on cycles (n/10)	
	33	6	4	Resistor 1 on cycles (n/10)	
	33	6	5	Resistor 2 on cycles (n/10)	
	33	6	6	Lifetime (h /10)	
	33	7		Statistics - 2	
	33	7	1	Showers n°	
	33	7	3	Heating remaining time	
	33	8		HP diagnostics - 1	
SET	33	8	0	Internal temperature	
	33	8	1	Required temperature	
P23	33	8	2	Dome temperature	
P22	33	8	3	High sensor temperature	
P21	33	8	4	Low sensor temperature	
	33	9		HP diagnostics - 2	
P24	33	9	0	Outside air temperature	
P25	33	9	1	HP Evaporator temp	
P26	33	9	2	HP Suction temp	
P28	33	9	3	HP Discharge temp	
P27	33	9	4	HP condenser outlet temp	
P29	33	9	5	Superheat temperature	
	33	10		HP diagnostics - 3	
ICONE DISPLAY	33	10	0	Status	0. Lockout 1. Idle 2. Heating 3. Thermal cleanse function 4. Antifreeze cycle
HP 	33	10	1	Heat pump mode	0. Not defined 1. Idle 2. Pre fan 3. Heating 4. Post fan 5. Defrost 6. Defrost 7. Air temp out of range 8. Charge mode
HP 	33	10	2	Heating mode	1. OFF 2. Heat Pump 3. HE1 4. HP + HE1 5. HE1 + HE2 6. HE2 7. HP + HE2 8. Auxiliary 9. HP + AUX

MENU HP/WH	MENU	SUB-MENU	PARAMETER	DESCRIPTION	RANGE
	33	10	3	PV integration active	OFF - ON
	33	10	4	SG active	OFF - ON
	33	11		HP diagnostics - 4	
	33	11	0	HP actual compressor frequency	
	33	11	1	Fan speed	
	33	11	2	Expansion valve	
	33	11	3	HC - HP input	OFF - ON
	33	11	4	PV - SG input	OFF - ON
	33	12		Error History	
P30	33	12	0	Last 10 errors	
P30	33	12	1	Reset error list	Reset? OK=Yes, esc=No
	33	13		Reset Menu	
P18	33	13	0	Reset factory settings	Reset? OK=Yes, esc=No
U9	33	13	1	Reset i - memory	Reset? OK=Yes, esc=No

10.5 – Anti-legionnaire’s disease protection function

The water heater has a completely automated anti-legionella function which can be disabled via parameter U5 in the information menu. The sanitization cycle brings the water in the product up to a sanitization temperature of 60°C (adjustable up to 75°C via parameter P3 in the installer menu) if, in the previous from 1-30 days (settable with P32-frequency parameter), the product has not reached and maintained a temperature of 60°C for at least one hour.

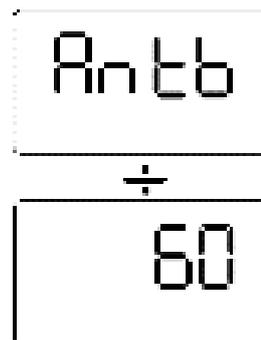
The cycle also activates each time the product has been without electrical power for at least 2 hours.

As these temperatures may cause burns, it is recommended that a thermostatic mixer is used.

During the anti-legionella cycle, the display will alternate between the message **Antib** and the temperature

Once the anti-legionella cycle has completed, the temperature will remain at the original setting.

To interrupt this function, press the ON/OFF key twice.



10.6 – Silent (P16 parameter)

This function reduces the sound level (performance can vary from those declared). It can be enabled via the P6 parameter on the installer's menu. When enabled, the image to the right appears on the display.



10.7 – Antifreeze function

This function is activated by default.

The antifreeze procedure shall perform in order to avoid water freezing into the tank, it occurs when:

- $T_{\text{water}} < 5^{\circ}\text{C}$
- The device receives power from mains (regardless of HC-HP, GREEN functioning and device OFF state).

This procedure switches ON the electrical resistance and brings water temperature to 16°C.

10.8 – Defrost function

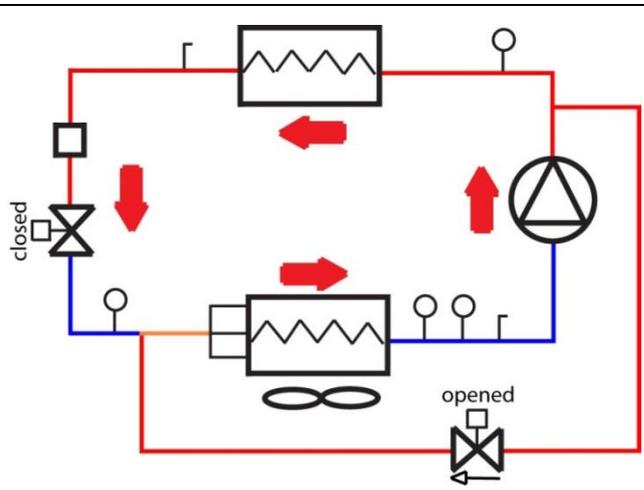
This function is activated by default.

The DEFROST process ensures good performances also in winter or with cold climate conditions, connecting temporarily output of compressor (high temperature and pressure) to input of evaporator (low temperature and pressure) (see picture on the right) in order to heat the evaporator and melt the ice that clogged it.

It will be activated if these conditions occur:

- The Heat Pump is working from 20 minutes (T_{water} is reaching $T_{\text{set-point}}$);
- $T_{\text{air}} < 15^{\circ}\text{C}$;
- T_{evap} decreases rapidly.

During the function, the heating element could turn on (i.e. if the Antifreeze function will occur, see previous paragraph).



10.9 – Number of showers

The icon to the side shows the estimated number of showers remaining, based on hot water availability. One shower is calculated as: 40 L at 40°C. Press the knob to view the value.



10.10 – Reset function

This function can be enabled via installer menu (P18 Parameter).

The RESET function restores all the factory default settings.

10.11 – Wi-Fi function

WiFi function (P31: ON) enables product to be connected with home network so to control remotely water heater operations. Below WiFi icon Connection Status Description:

WiFi ICON		
	On	WiFi connected to home network
	Slow Flashing	WiFi ON but not connected to home network
	Quick Flashing	WiFi module is working as Access Point
	Off	WiFi OFF or not connected
Visualized Icons on Display:		
	AP inscription	WiFi module is working as Access Point
	WiFi Icon ON	Connection activated
	WiFi Icon OFF	Connection not activated

WiFi CONFIGURATION & PRODUCT REGISTRATION

For detailed information on the WiFi configuration and product registration procedure refer to the enclosed, dedicated connectivity Quick Start Guide.

It is based on 3 steps as the ones below:

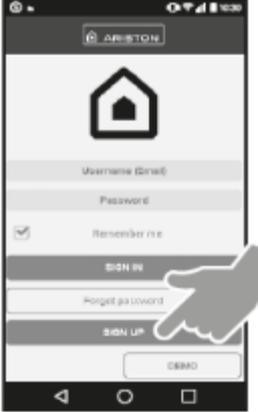
- **Account Creation**
- **WiFi configuration & product registration**
- **Procedure Completed**

Let's deep dive on any single phase.

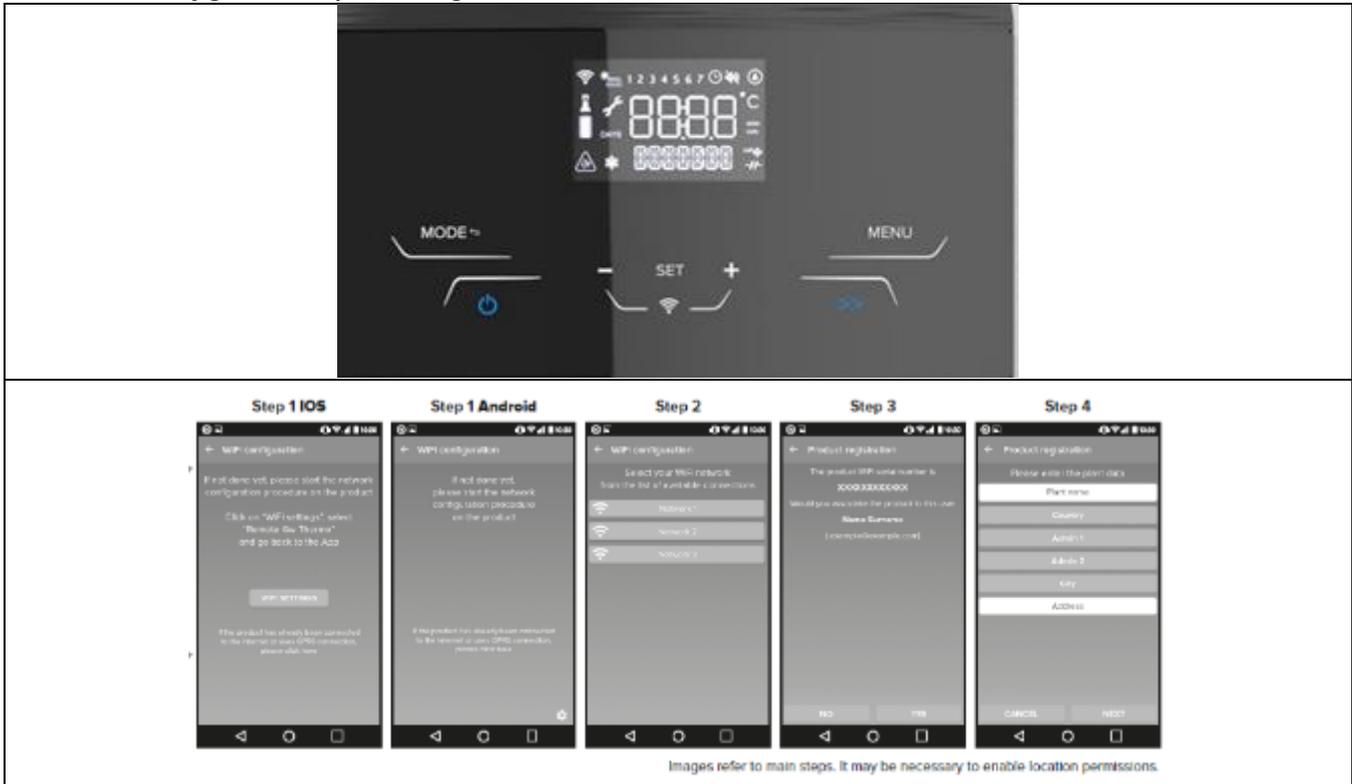
- **Account Creation**

 <p>(A)</p>	<p>Download the <i>Aqua Ariston NET</i> App from Apple Store or Google Play for free.</p>
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Click on the SIGN UP button in the App and fill in the fields. Check your mailbox and click on the link to activate the user account.

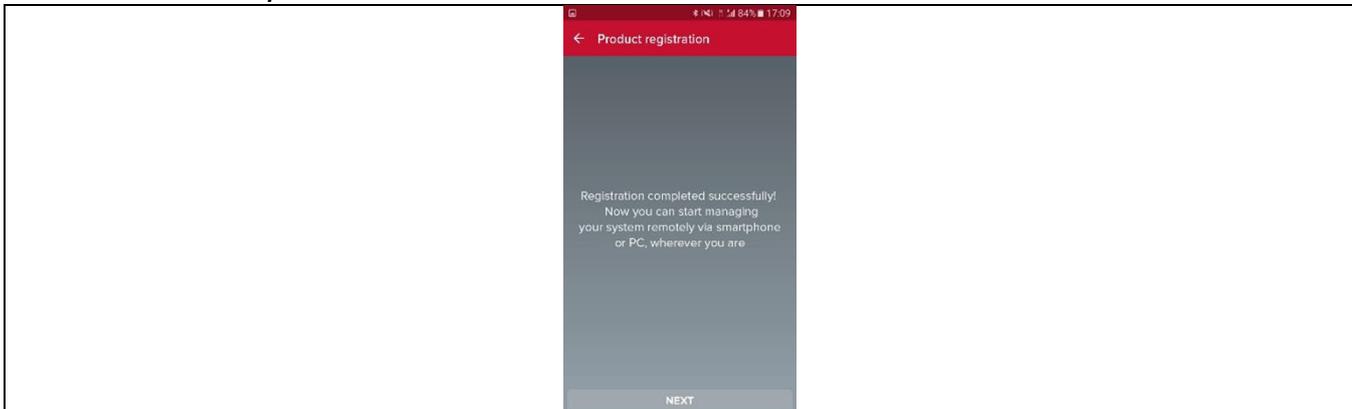
			
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- **WiFi configuration & product registration**



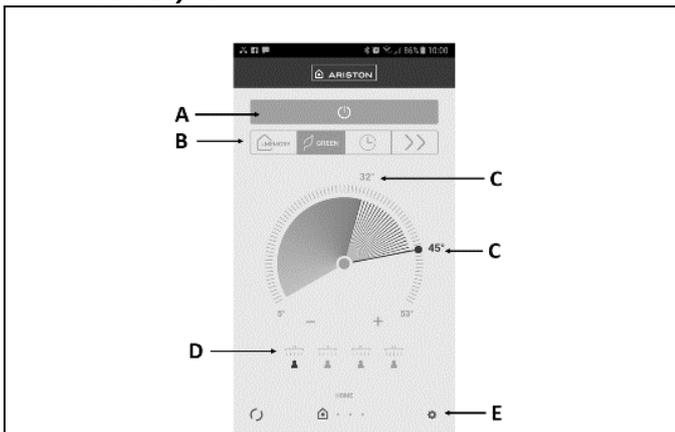
- A** Press contemporary buttons “+” & “-“. Indicator will flash slowly.
- B** Press contemporary buttons “+” & “-“ again for 5 seconds to create the Access Point (AP led on). The WiFi indicator will flash quickly (13 flashes per second)
- C** Log in to Aqua NET App and follow the wizard to connect and register your product.

- **Procedure Completed**



- A** The connection is successful when:
 - a) The “AP” icon disappears and the WI-FI icon appears on the display. The Wi-Fi indicator lamp will now stay on.
 - b) The App shows the successful registration message.

- **APP Layout**



- Following functions are included :
- On/Off (A);
 - Mode
 - Knob for adjusting of temperature. Press and slide for increase or decrease the desired temperature or use the buttons + and -. The set temperature is shown in red (ex. 45°) and the one detected inside the tank in gray (ex. 32°) (C)
 - Number of available shower. (D)
 - Button for Advanced Setting page (E)
- Sliding on the right pages about: Water heating programming, energy consumption and other information are available.

11 – TROUBLESHOOTING

In case of one of following errors occur, check paragraph 12.

Error code	Cause	Heating element operation	Heat pump operation	What to do	Volatile or Not volatile
Encoding of heat pump circuit codes					
007	NTC Condenser: Open or Short Circuit	ON	OFF	Verify NTC Condenser proper functioning	Volatile
008	NTC Discharge (Compressor Outlet): Open or Short Circuit	ON	OFF	Verify NTC Discharge proper functioning	Volatile
009	NTC Air: Open or Short Circuit	ON	OFF	Verify NTC Air proper functioning	Volatile
010	NTC Evap: Open or Short Circuit	ON	OFF	Verify NTC Evap proper functioning	Volatile
012	NTC Suction (Compressor Inlet): Open or Short Circuit	ON	OFF	Verify NTC Suction proper functioning	Volatile
021	Gas Leak	ON	OFF	Verify compressor inlet sensor proper functioning. If the error persists, recover residual gas; find the leak in the cooling circuit; repair it; make vacuum and recharge circuit with the required quantity of refrigerant gas.	Not volatile
032	Compressor Issue	ON	OFF	Check power voltage on compressor connector.	Not volatile
042	Evaporator Obstructed	ON	OFF	Turn off the appliance. Check that the evaporator and the external unit casing is not obstructed.	Not volatile
044	Fan Issue	ON	OFF	Check power voltage on fan connector. Control the proper functioning of sensor at compressor inlet.	Not volatile
051	High Pressure	ON	OFF	Check pressure switch wiring. Verify gas quantity.	Not volatile
053	Compressor Thermal Protector: KO	ON	OFF	Check compressor thermal protector connector.	Not volatile
081	Electronic Expansion Valve Issue	ON	OFF	Verify expansion valve cables. Verify NTC suction and NTC Evap correct functioning.	Not volatile
Encoding of domestic water circuit codes					
218	Dome NTC sensor (hot water): Open or Short Circuit	ON	OFF	Verify NTC sensor (hot water) proper functioning	Volatile
230	Water Temperature Sensor (Heating Element Zone): Open or Short Circuit	OFF	OFF	Check the correct assembly of sensor wiring on related mainboard connector. Verify sensor proper functioning.	Volatile
231	Water Temperature sensor (Heating Element Zone): safety intervention (1st level).	OFF	OFF	Verify sensor proper functioning.	Not volatile
232	Water Temperature sensor (Heating Element Zone): safety intervention (2nd level).	OFF	OFF	Verify sensor proper functioning.	Not volatile
233	Relay blocked	OFF	OFF	Reset the appliance by pressing the ON/OFF button twice. If the error persists, replace the motherboard.	Not volatile
241	Impressed Current Anode: Open Circuit	OFF	OFF	Check the presence of water inside the product. If the error persists, verify the anode proper functioning. Check the correct assembly of anode wiring on related mainboard connector. If the error persists, replace mainboard.	Not volatile
Encoding of electronic circuit codes					
314	ON / OFF repeated	OFF	OFF	Wait 15 minutes before unlocking the product with ON/OFF button	Volatile
321	Corrupted data	OFF	OFF	Reset the product by pressing the ON / OFF button twice. If the error	Not volatile

				persists, replace the motherboard.	
331/ 332	Missing communication between Main Board and HMI	OFF	OFF	Reset the product by pushing the ON/OFF button twice. If the error persists, replace the mainboard-display communication wiring.	Volatile
333	Mainboard – WiFi board missing communication	ON	ON	If WiFi present: - Check cables between motherboard and HMI. - If the error persists, replace the HMI module. If WiFi not present: - Enter to the Installer Menu and set P31 OFF. - If the error occurs again, replace the Main Board.	Volatile
334	Missing Communication between Inverter and main board	ON	OFF	Check the communication cable and the related motherboard and TDC cables. If the error persists, replace the TCD.	Volatile
335	Safety board communication failure	OFF	OFF	Reset the product by pressing the ON / OFF button twice. If the error persists, replace the motherboard.	Volatile
336	Touch screen not working	ON	ON	Reset the product by pressing the ON / OFF button twice. If the error persists, replace the HMI.	Volatile
337	Cascade master missing	OFF	OFF	Check that at least one of the products in the cascade is set as Master, otherwise set one.	Volatile

12 – PROCEDURES OF CHECKING

12.1 – Preliminary operations

Initial prescriptions before any maintenance operation:

- a) Verify that the safety valve (compliant to the norm EN1487) is correctly assembled since product installation date;
- b) Verify installation correctness with respect to the schemes on the user manual;
- c) Check the errors history in the installer menu: parameter P30;
- d) Only for SYS and TWIN SYS products: remember that the maximum water temperature from auxiliary heat generator has to be lower than 75°C. Check and eventually correct the maximum temperature achieved from the auxiliary heat generator;
- e) Reset the product by pushing the ON/OFF button twice;
- f) Set GREEN mode;
- g) Cool the water in the tank, until P21=P22=P23~20°C;
- h) During maintenance operations, do not perform water tapplings.

Instruments to be used for maintenance operations:

- Digital thermometer with contact thermocouple (type T);
- Manometer for R134a;
- Recovery / recycle, vacuum and recharge equipment (scale included);
- Sniffer (at least 5g/year sensibility);
- Multimeter with leads.

Digital thermometer with contact thermocouple (type T)



Manometer for R134a



Recovery / recycle, vacuum and recharge equipment (scale included)



Sniffer (at least 5g/year sensibility)



Multimeter with leads



12.2 – Procedures

12.2.1 - Error 007

Description: NTC Condenser: Open or Short Circuit

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

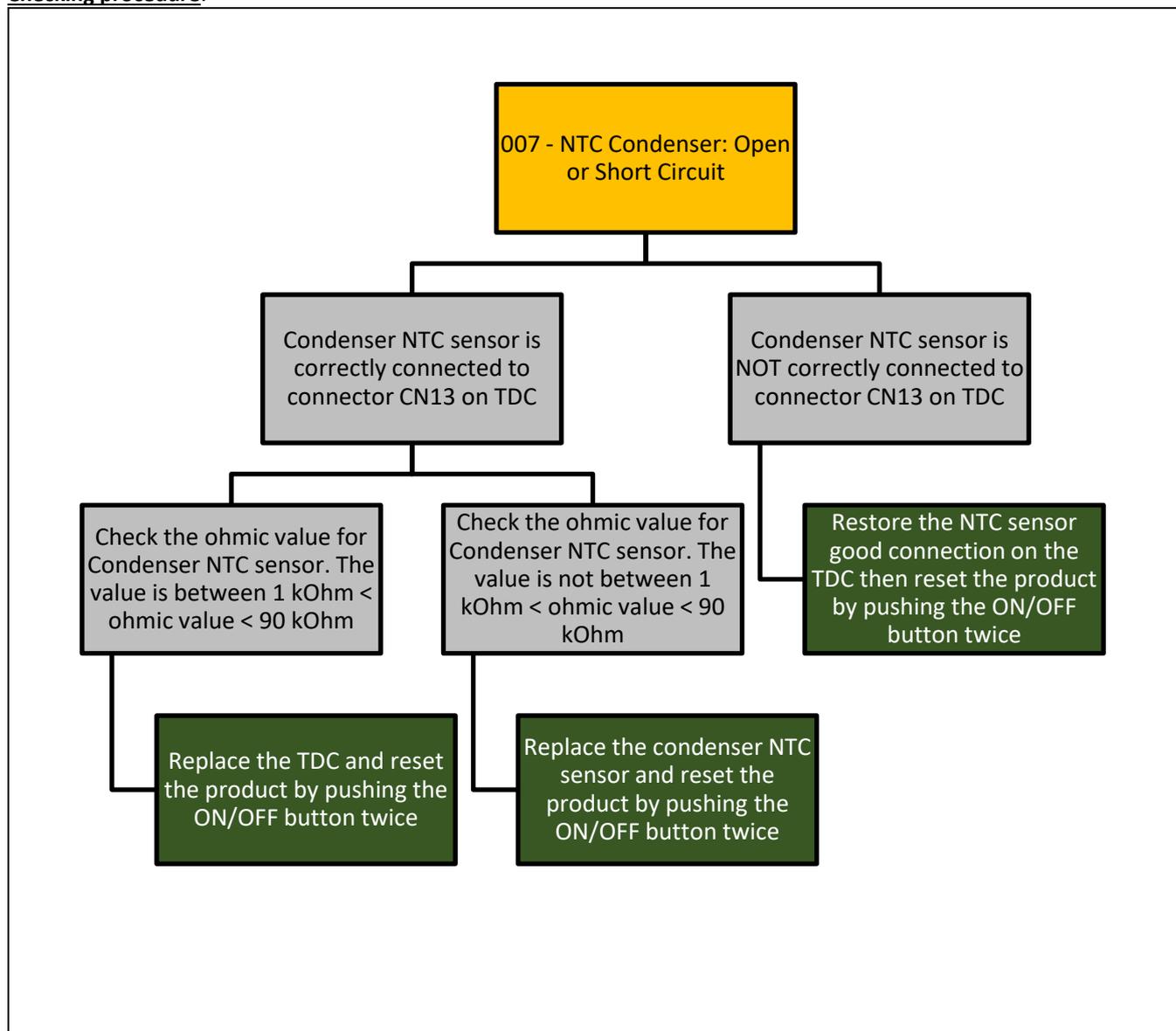
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- NTC Condenser;
- TDC board.

Checking procedure:



NTC Conversion Table

10k Table: Tdome, Thigh, Tlow, Tair, Tdischarge, Tcondenser

°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm
-40	188.5	-19	64.9	2	25.17	23	10.78	44	5.09	65	2.59	86	1.41	107	0.82
-39	179.62	-18	62.03	3	24.12	24	10.38	45	4.92	66	2.51	87	1.37	108	0.80
-38	170.74	-17	59.15	4	23.07	25	10.00	46	4.75	67	2.44	88	1.34	109	0.78
-37	161.86	-16	56.28	5	22.02	26	9.63	47	4.60	68	2.36	89	1.30	110	0.76
-36	152.98	-15	53.41	6	21.12	27	9.28	48	4.45	69	2.29	90	1.27	111	0.74
-35	144.1	-14	51.22	7	20.27	28	8.95	49	4.30	70	2.23	91	1.23	112	0.72
-34	137.54	-13	49.03	8	19.45	29	8.62	50	4.16	71	2.16	92	1.20	113	0.70
-33	130.98	-12	46.85	9	18.67	30	8.31	51	4.03	72	2.10	93	1.17	114	0.69
-32	124.42	-11	44.66	10	17.93	31	8.02	52	3.90	73	2.04	94	1.14	115	0.67
-31	117.86	-10	42.47	11	17.21	32	7.73	53	3.77	74	1.98	95	1.11	116	0.66
-30	111.3	-9	40.76	12	16.53	33	7.46	54	3.65	75	1.92	96	1.08	117	0.64
-29	106.33	-8	39.04	13	15.89	34	7.20	55	3.54	76	1.87	97	1.05	118	0.63
-28	101.35	-7	37.33	14	15.27	35	6.95	56	3.42	77	1.82	98	1.03	119	0.61
-27	96.38	-6	35.61	15	14.67	36	6.71	57	3.32	78	1.77	99	1.00	120	0.60
-26	91.4	-5	33.9	16	14.11	37	6.48	58	3.21	79	1.72	100	0.97	121	0.58
-25	86.43	-4	32.57	17	13.57	38	6.25	59	3.11	80	1.67	101	0.95	122	0.57
-24	82.7	-3	31.24	18	13.05	39	6.04	60	3.01	81	1.62	102	0.93	123	0.56
-23	78.97	-2	29.92	19	12.55	40	5.83	61	2.92	82	1.58	103	0.90	124	0.54
-22	75.23	-1	28.6	20	12.08	41	5.64	62	2.83	83	1.53	104	0.88	125	0.53
-21	71.5	0	27.28	21	11.63	42	5.45	63	2.75	84	1.49	105	0.86		
-20	67.77	1	26.23	22	11.19	43	5.26	64	2.67	85	1.45	106	0.84		

12.2.2 - Error 008

Description: NTC Discharge (Compressor Outlet):Open or Short Circuit

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

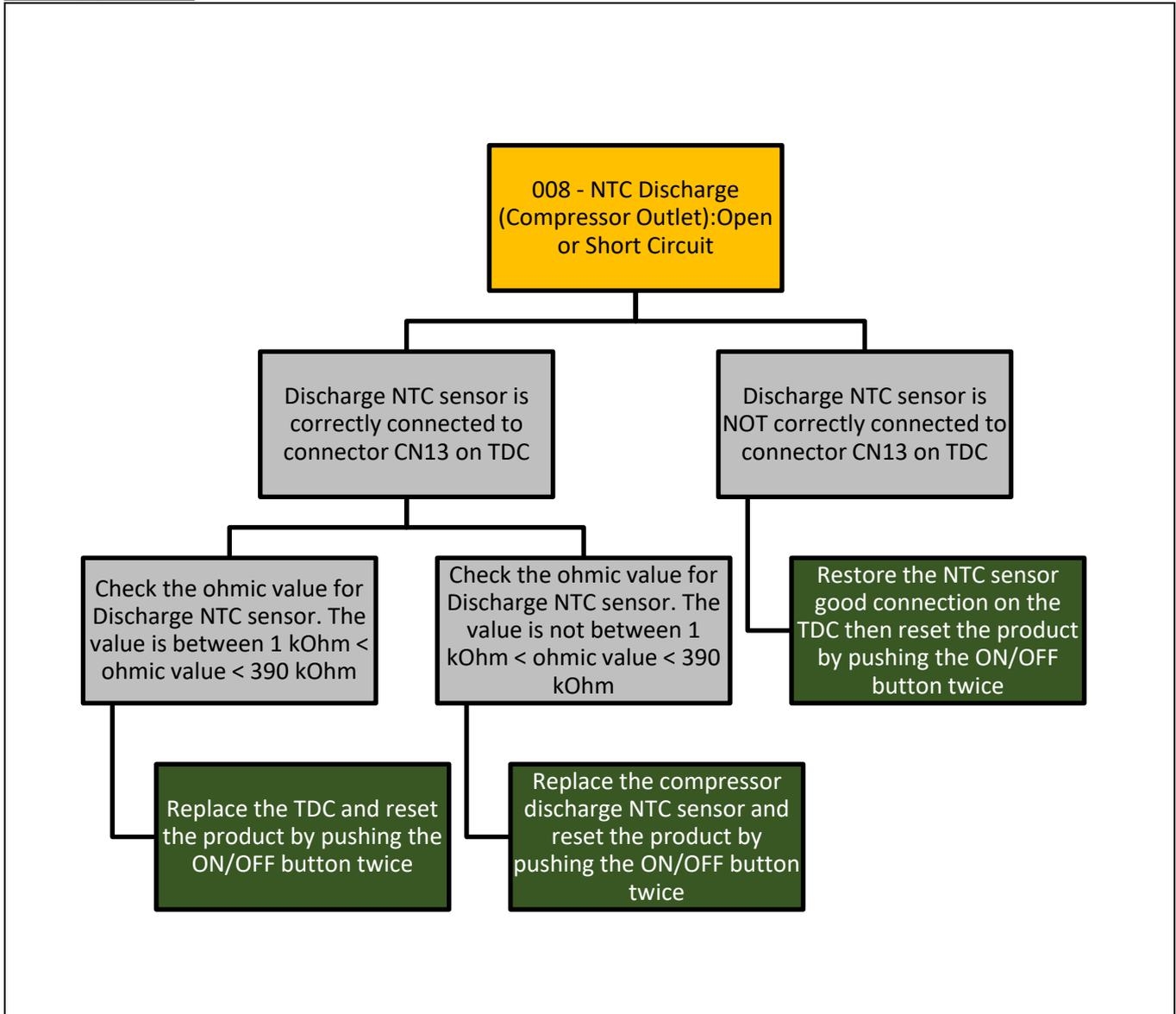
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- NTC Discharge;
- TDC board.

Checking procedure:



NTC Conversion Table

10k Table: Tdome, Thigh, Tlow, Tair, Tdischarge, Tcondenser

°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm
-40	188.5	-19	64.9	2	25.17	23	10.78	44	5.09	65	2.59	86	1.41	107	0.82
-39	179.62	-18	62.03	3	24.12	24	10.38	45	4.92	66	2.51	87	1.37	108	0.80
-38	170.74	-17	59.15	4	23.07	25	10.00	46	4.75	67	2.44	88	1.34	109	0.78
-37	161.86	-16	56.28	5	22.02	26	9.63	47	4.60	68	2.36	89	1.30	110	0.76
-36	152.98	-15	53.41	6	21.12	27	9.28	48	4.45	69	2.29	90	1.27	111	0.74
-35	144.1	-14	51.22	7	20.27	28	8.95	49	4.30	70	2.23	91	1.23	112	0.72
-34	137.54	-13	49.03	8	19.45	29	8.62	50	4.16	71	2.16	92	1.20	113	0.70
-33	130.98	-12	46.85	9	18.67	30	8.31	51	4.03	72	2.10	93	1.17	114	0.69
-32	124.42	-11	44.66	10	17.93	31	8.02	52	3.90	73	2.04	94	1.14	115	0.67
-31	117.86	-10	42.47	11	17.21	32	7.73	53	3.77	74	1.98	95	1.11	116	0.66
-30	111.3	-9	40.76	12	16.53	33	7.46	54	3.65	75	1.92	96	1.08	117	0.64
-29	106.33	-8	39.04	13	15.89	34	7.20	55	3.54	76	1.87	97	1.05	118	0.63
-28	101.35	-7	37.33	14	15.27	35	6.95	56	3.42	77	1.82	98	1.03	119	0.61
-27	96.38	-6	35.61	15	14.67	36	6.71	57	3.32	78	1.77	99	1.00	120	0.60
-26	91.4	-5	33.9	16	14.11	37	6.48	58	3.21	79	1.72	100	0.97	121	0.58
-25	86.43	-4	32.57	17	13.57	38	6.25	59	3.11	80	1.67	101	0.95	122	0.57
-24	82.7	-3	31.24	18	13.05	39	6.04	60	3.01	81	1.62	102	0.93	123	0.56
-23	78.97	-2	29.92	19	12.55	40	5.83	61	2.92	82	1.58	103	0.90	124	0.54
-22	75.23	-1	28.6	20	12.08	41	5.64	62	2.83	83	1.53	104	0.88	125	0.53
-21	71.5	0	27.28	21	11.63	42	5.45	63	2.75	84	1.49	105	0.86		
-20	67.77	1	26.23	22	11.19	43	5.26	64	2.67	85	1.45	106	0.84		

12.2.3 - Error 009

Description: NTC Air: Open or Short Circuit

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

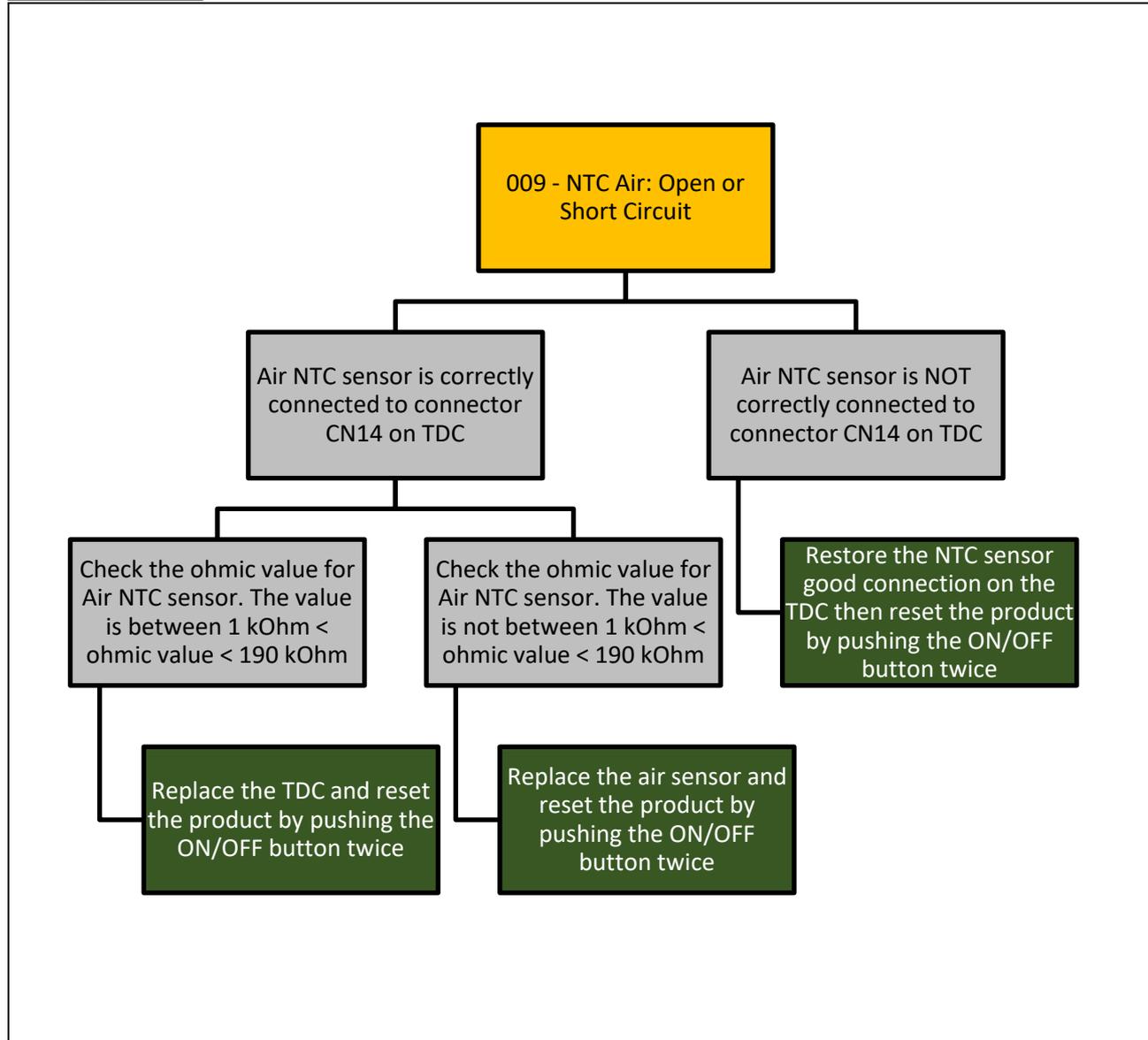
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- Air NTC sensor;
- TDC board.

Checking procedure:



NTC Conversion Table

10k Table: Tdome, Thigh, Tlow, Tair, Tdischarge, Tcondenser

°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm
-40	188.5	-19	64.9	2	25.17	23	10.78	44	5.09	65	2.59	86	1.41	107	0.82
-39	179.62	-18	62.03	3	24.12	24	10.38	45	4.92	66	2.51	87	1.37	108	0.80
-38	170.74	-17	59.15	4	23.07	25	10.00	46	4.75	67	2.44	88	1.34	109	0.78
-37	161.86	-16	56.28	5	22.02	26	9.63	47	4.60	68	2.36	89	1.30	110	0.76
-36	152.98	-15	53.41	6	21.12	27	9.28	48	4.45	69	2.29	90	1.27	111	0.74
-35	144.1	-14	51.22	7	20.27	28	8.95	49	4.30	70	2.23	91	1.23	112	0.72
-34	137.54	-13	49.03	8	19.45	29	8.62	50	4.16	71	2.16	92	1.20	113	0.70
-33	130.98	-12	46.85	9	18.67	30	8.31	51	4.03	72	2.10	93	1.17	114	0.69
-32	124.42	-11	44.66	10	17.93	31	8.02	52	3.90	73	2.04	94	1.14	115	0.67
-31	117.86	-10	42.47	11	17.21	32	7.73	53	3.77	74	1.98	95	1.11	116	0.66
-30	111.3	-9	40.76	12	16.53	33	7.46	54	3.65	75	1.92	96	1.08	117	0.64
-29	106.33	-8	39.04	13	15.89	34	7.20	55	3.54	76	1.87	97	1.05	118	0.63
-28	101.35	-7	37.33	14	15.27	35	6.95	56	3.42	77	1.82	98	1.03	119	0.61
-27	96.38	-6	35.61	15	14.67	36	6.71	57	3.32	78	1.77	99	1.00	120	0.60
-26	91.4	-5	33.9	16	14.11	37	6.48	58	3.21	79	1.72	100	0.97	121	0.58
-25	86.43	-4	32.57	17	13.57	38	6.25	59	3.11	80	1.67	101	0.95	122	0.57
-24	82.7	-3	31.24	18	13.05	39	6.04	60	3.01	81	1.62	102	0.93	123	0.56
-23	78.97	-2	29.92	19	12.55	40	5.83	61	2.92	82	1.58	103	0.90	124	0.54
-22	75.23	-1	28.6	20	12.08	41	5.64	62	2.83	83	1.53	104	0.88	125	0.53
-21	71.5	0	27.28	21	11.63	42	5.45	63	2.75	84	1.49	105	0.86		
-20	67.77	1	26.23	22	11.19	43	5.26	64	2.67	85	1.45	106	0.84		

12.2.4 - Error 010

Description: NTC Evap: Open or Short Circuit

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

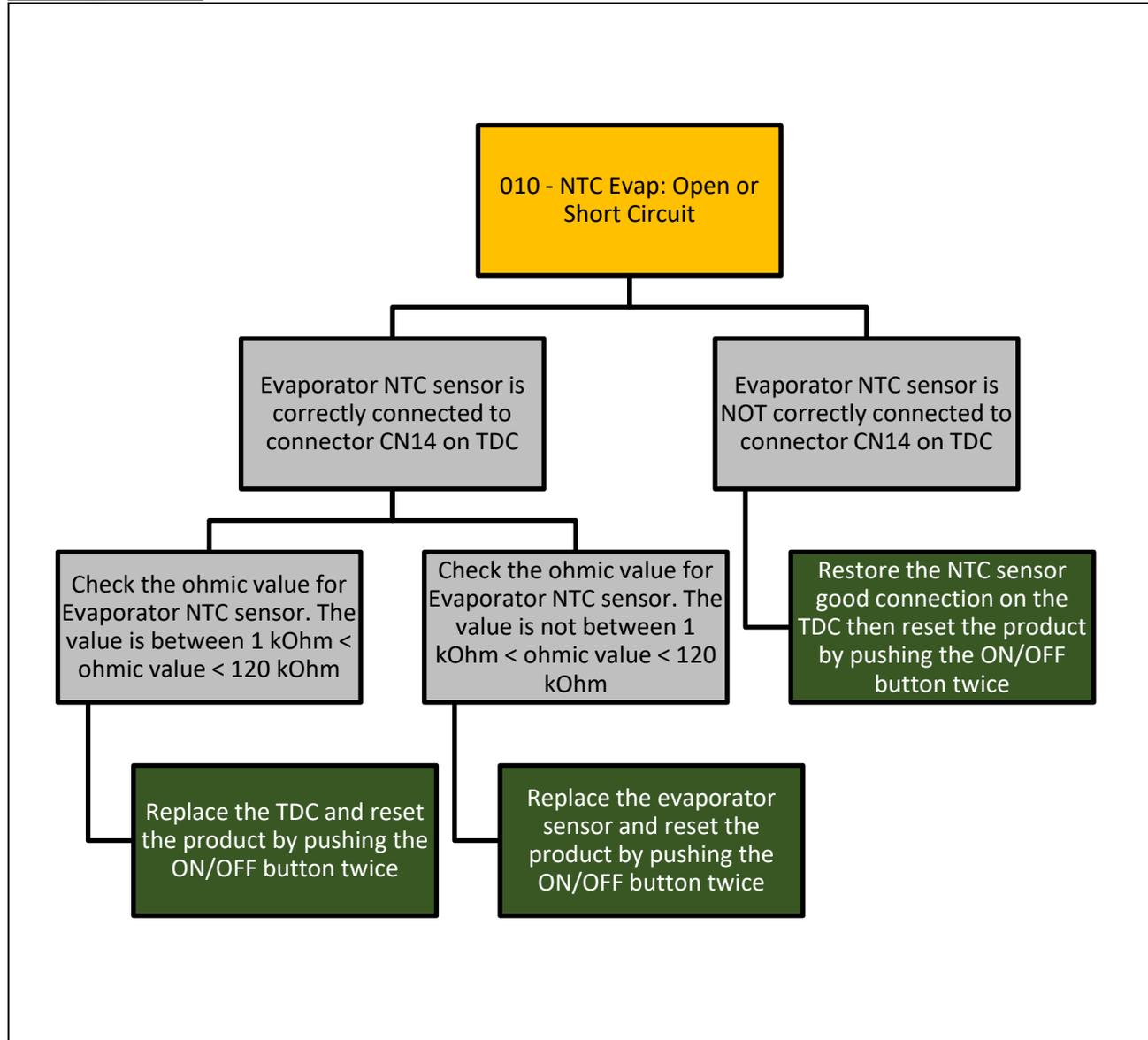
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- Evaporator NTC sensor;
- TDC board.

Checking procedure:



NTC Conversion Table

5k Table: TSuction, Tevap

°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm
-40	111.61	-19	34.87	2	12.91	23	5.41	44	2.49	65	1.26	86	0.68	107	0.39	128	0.39	128	0.39
-39	105.04	-18	33.15	3	12.35	24	5.20	45	2.40	66	1.22	87	0.67	108	0.38	129	0.38	129	0.38
-38	98.93	-17	31.53	4	11.82	25	5.00	46	2.32	67	1.19	88	0.65	109	0.37	130	0.37	130	0.37
-37	93.22	-16	30.00	5	11.31	26	4.81	47	2.25	68	1.15	89	0.63	110	0.36	131	0.36	131	0.36
-36	87.89	-15	28.55	6	10.83	27	4.62	48	2.17	69	1.12	90	0.61	111	0.36	132	0.36	132	0.36
-35	82.92	-14	27.18	7	10.37	28	4.45	49	2.10	70	1.08	91	0.60	112	0.35	133	0.35	133	0.35
-34	78.26	-13	25.88	8	9.93	29	4.28	50	2.03	71	1.05	92	0.58	113	0.34	134	0.34	134	0.34
-33	73.91	-12	24.66	9	9.51	30	4.12	51	1.97	72	1.02	93	0.56	114	0.33	135	0.33	135	0.33
-32	69.84	-11	23.50	10	9.12	31	3.97	52	1.90	73	0.99	94	0.55	115	0.32	136	0.32	136	0.32
-31	66.03	-10	22.40	11	8.99	32	3.82	53	1.84	74	0.96	95	0.53	116	0.32	137	0.32	137	0.32
-30	62.45	-9	21.36	12	8.60	33	3.68	54	1.78	75	0.94	96	0.52	117	0.31	138	0.31	138	0.31
-29	59.10	-8	20.38	13	8.23	34	3.55	55	1.73	76	0.91	97	0.51	118	0.30	139	0.30	139	0.30
-28	55.95	-7	19.44	14	7.88	35	3.42	56	1.67	77	0.88	98	0.49	119	0.29	140	0.29	140	0.29
-27	53.00	-6	18.56	15	7.54	36	3.30	57	1.62	78	0.86	99	0.48	120	0.29	141	0.29	141	0.29
-26	50.22	-5	17.72	16	7.23	37	3.18	58	1.57	79	0.83	100	0.47	121	0.28	142	0.28	142	0.28
-25	47.61	-4	16.92	17	6.93	38	3.07	59	1.52	80	0.81	101	0.45	122	0.27	143	0.27	143	0.27
-24	45.16	-3	16.16	18	6.64	39	2.96	60	1.47	81	0.79	102	0.44	123	0.27	144	0.27	144	0.27
-23	42.85	-2	15.44	19	6.37	40	2.86	61	1.43	82	0.77	103	0.43	124	0.26	145	0.26	145	0.26
-22	40.67	-1	14.76	20	6.11	41	2.76	62	1.38	83	0.74	104	0.42	125	0.26	146	0.26	146	0.26
-21	38.62	0	14.11	21	5.87	42	2.67	63	1.34	84	0.72	105	0.41	126	0.25	147	0.25	147	0.25
-20	36.69	1	13.49	22	5.64	43	2.57	64	1.30	85	0.70	106	0.40	127	0.25	148	0.25	148	0.25

12.2.5 - Error 012

Description: NTC Suction (Compressor Inlet): Open or Short Circuit

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

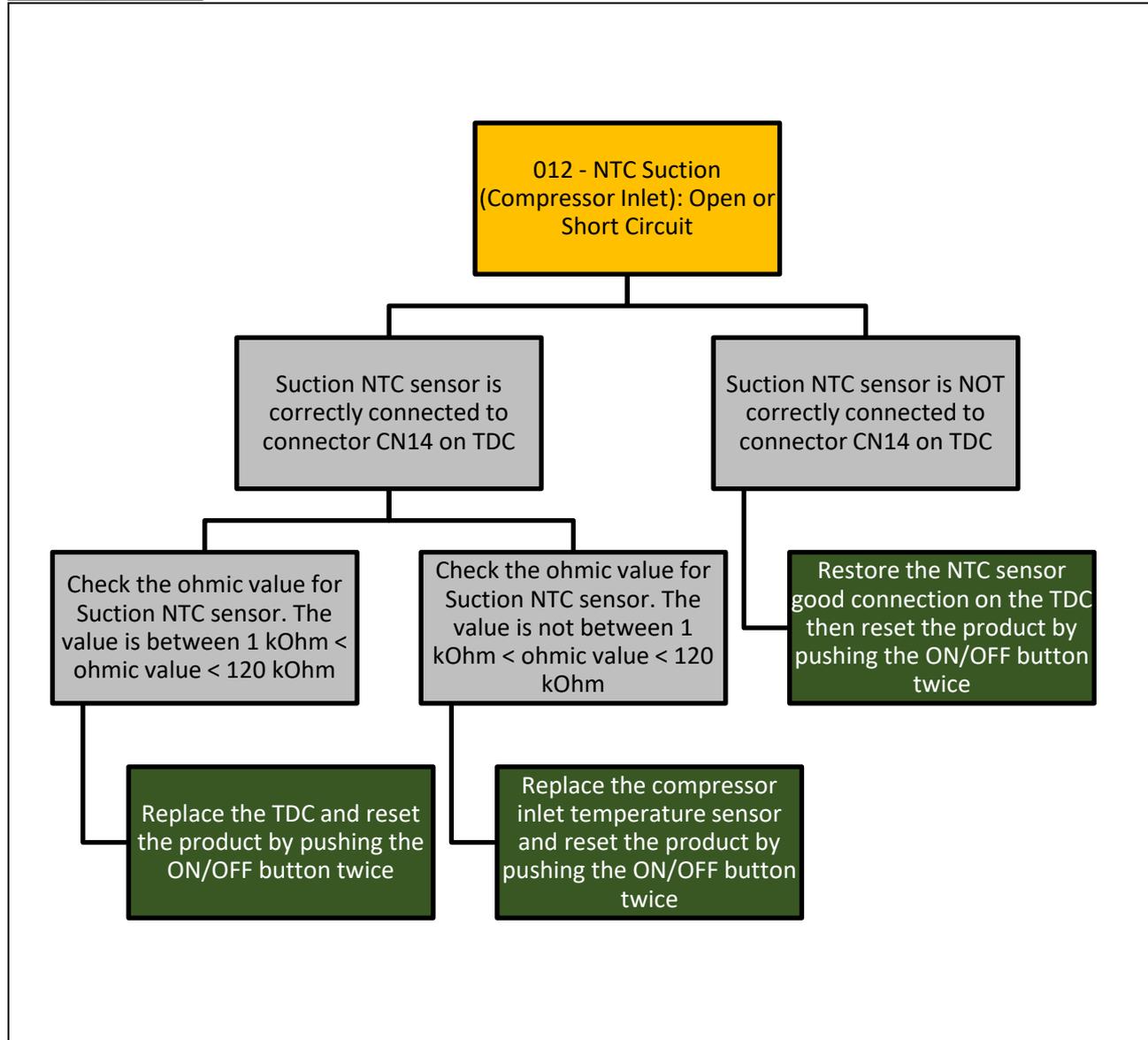
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- NTC Suction;
- TDC board.

Checking procedure:



NTC Conversion Table

5k Table: TSuction, Tevap

°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm
-40	111.61	-19	34.87	2	12.91	23	5.41	44	2.49	65	1.26	86	0.68	107	0.39	128	0.39	128	0.39
-39	105.04	-18	33.15	3	12.35	24	5.20	45	2.40	66	1.22	87	0.67	108	0.38	129	0.38	129	0.38
-38	98.93	-17	31.53	4	11.82	25	5.00	46	2.32	67	1.19	88	0.65	109	0.37	130	0.37	130	0.37
-37	93.22	-16	30.00	5	11.31	26	4.81	47	2.25	68	1.15	89	0.63	110	0.36	131	0.36	131	0.36
-36	87.89	-15	28.55	6	10.83	27	4.62	48	2.17	69	1.12	90	0.61	111	0.36	132	0.36	132	0.36
-35	82.92	-14	27.18	7	10.37	28	4.45	49	2.10	70	1.08	91	0.60	112	0.35	133	0.35	133	0.35
-34	78.26	-13	25.88	8	9.93	29	4.28	50	2.03	71	1.05	92	0.58	113	0.34	134	0.34	134	0.34
-33	73.91	-12	24.66	9	9.51	30	4.12	51	1.97	72	1.02	93	0.56	114	0.33	135	0.33	135	0.33
-32	69.84	-11	23.50	10	9.12	31	3.97	52	1.90	73	0.99	94	0.55	115	0.32	136	0.32	136	0.32
-31	66.03	-10	22.40	11	8.99	32	3.82	53	1.84	74	0.96	95	0.53	116	0.32	137	0.32	137	0.32
-30	62.45	-9	21.36	12	8.60	33	3.68	54	1.78	75	0.94	96	0.52	117	0.31	138	0.31	138	0.31
-29	59.10	-8	20.38	13	8.23	34	3.55	55	1.73	76	0.91	97	0.51	118	0.30	139	0.30	139	0.30
-28	55.95	-7	19.44	14	7.88	35	3.42	56	1.67	77	0.88	98	0.49	119	0.29	140	0.29	140	0.29
-27	53.00	-6	18.56	15	7.54	36	3.30	57	1.62	78	0.86	99	0.48	120	0.29	141	0.29	141	0.29
-26	50.22	-5	17.72	16	7.23	37	3.18	58	1.57	79	0.83	100	0.47	121	0.28	142	0.28	142	0.28
-25	47.61	-4	16.92	17	6.93	38	3.07	59	1.52	80	0.81	101	0.45	122	0.27	143	0.27	143	0.27
-24	45.16	-3	16.16	18	6.64	39	2.96	60	1.47	81	0.79	102	0.44	123	0.27	144	0.27	144	0.27
-23	42.85	-2	15.44	19	6.37	40	2.86	61	1.43	82	0.77	103	0.43	124	0.26	145	0.26	145	0.26
-22	40.67	-1	14.76	20	6.11	41	2.76	62	1.38	83	0.74	104	0.42	125	0.26	146	0.26	146	0.26
-21	38.62	0	14.11	21	5.87	42	2.67	63	1.34	84	0.72	105	0.41	126	0.25	147	0.25	147	0.25
-20	36.69	1	13.49	22	5.64	43	2.57	64	1.30	85	0.70	106	0.40	127	0.25	148	0.25	148	0.25

12.2.6 - Error 021

Description: Gas Leak

Preliminary operations:

- Follow the guideline for preliminary operations explained in par. 12.1;
- Check the R134a vacuum and recharge procedure (paragraph 12.3)

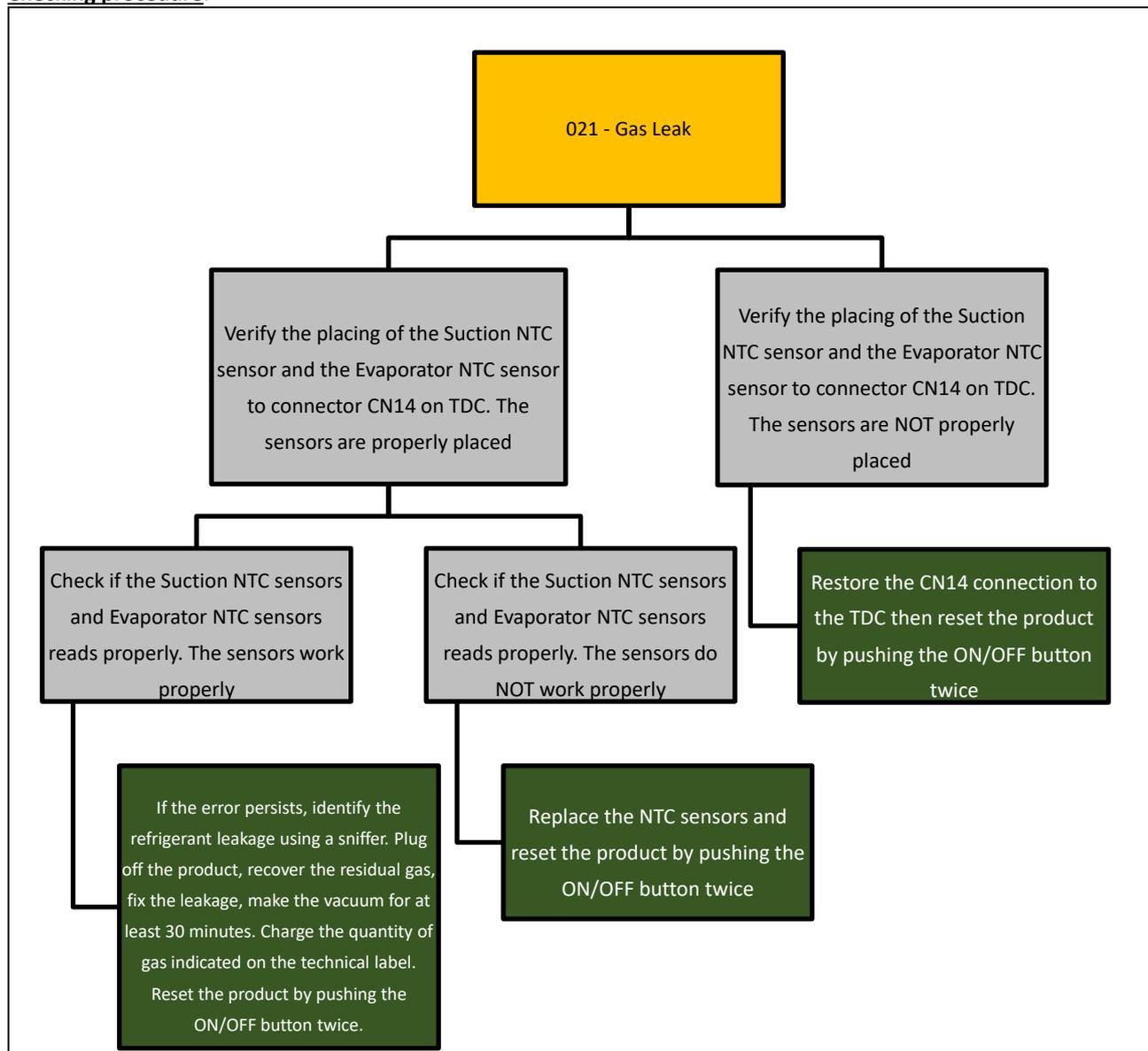
Useful instruments:

- Digital thermometer with contact thermocouple (type T);
- Sniffer (at least 5 g/year sensibility);
- Recovery/recycle, vacuum and recharge equipment (scale included);
- Manometer for R134a.

Useful spare parts:

- Suction NTC sensor.

Checking procedure:



12.2.7 - Error 032

Description: Compressor Issue

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

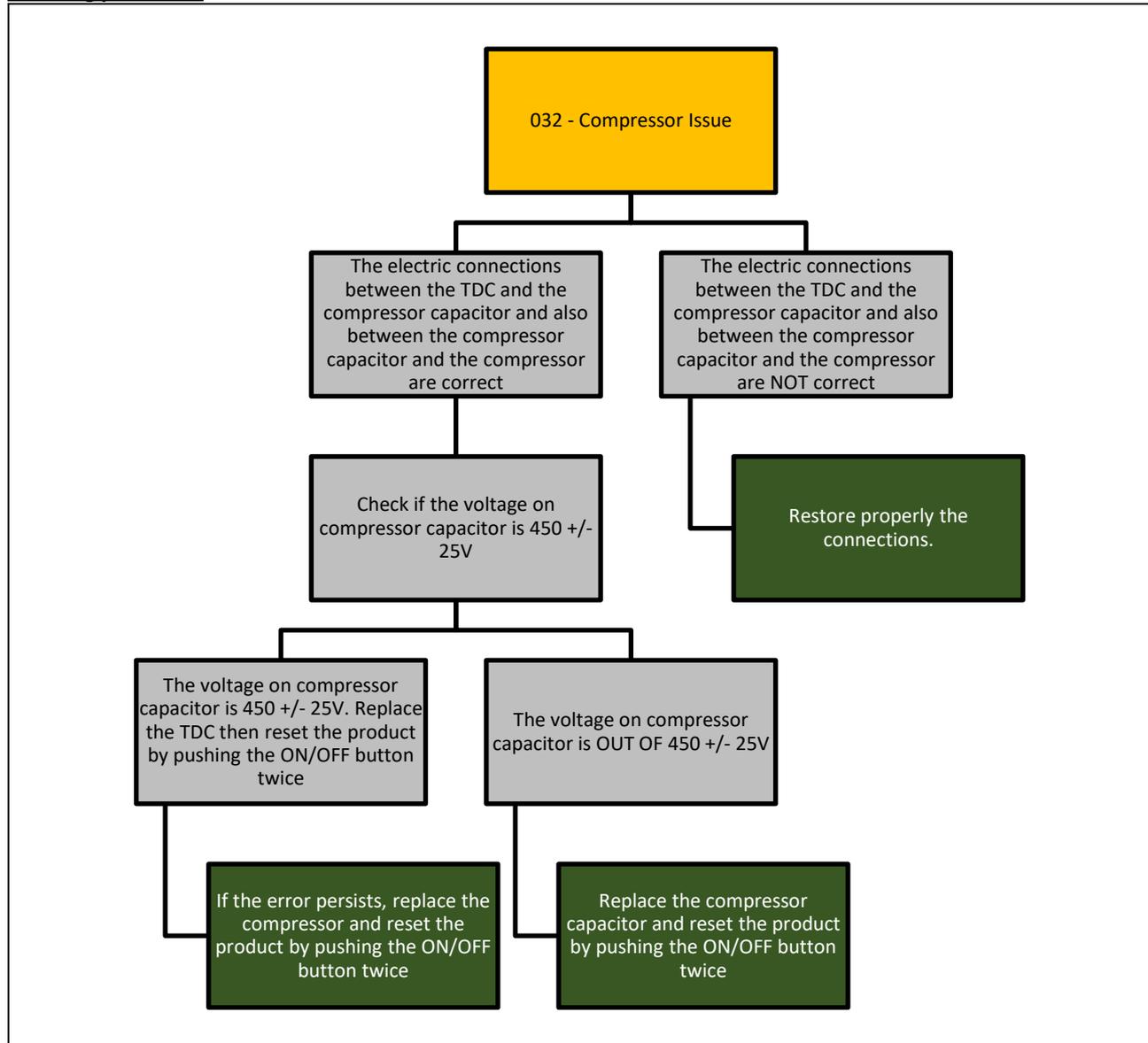
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- TDC board;
- Compressor capacitor;
- Compressor.

Checking procedure:



12.2.8 - Error 042

Description: Evaporator Obstructed

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

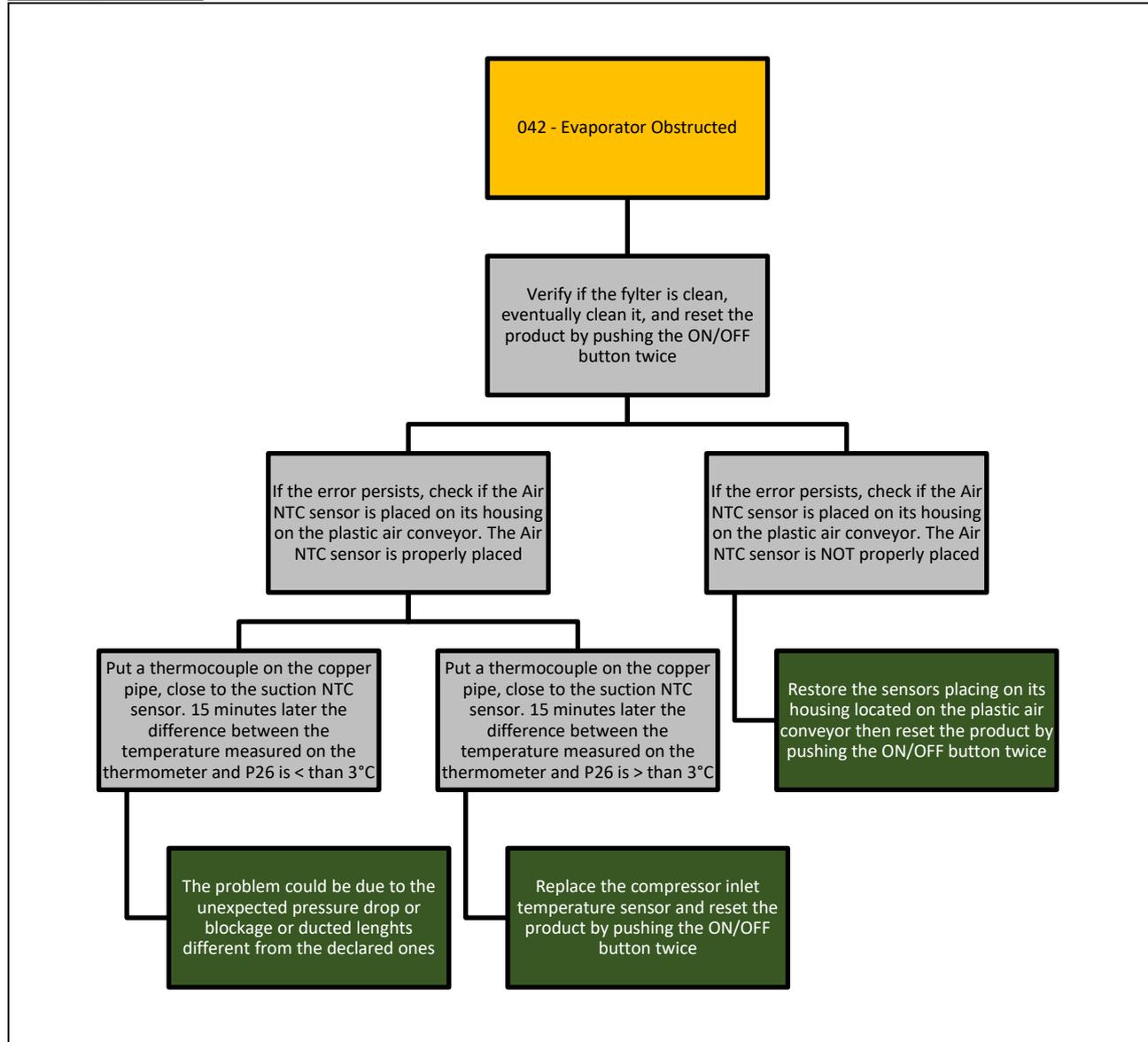
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- Suction NTC sensor;
- Fylter.

Checking procedure:



12.2.9 - Error 044

Description: Fan Issue

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

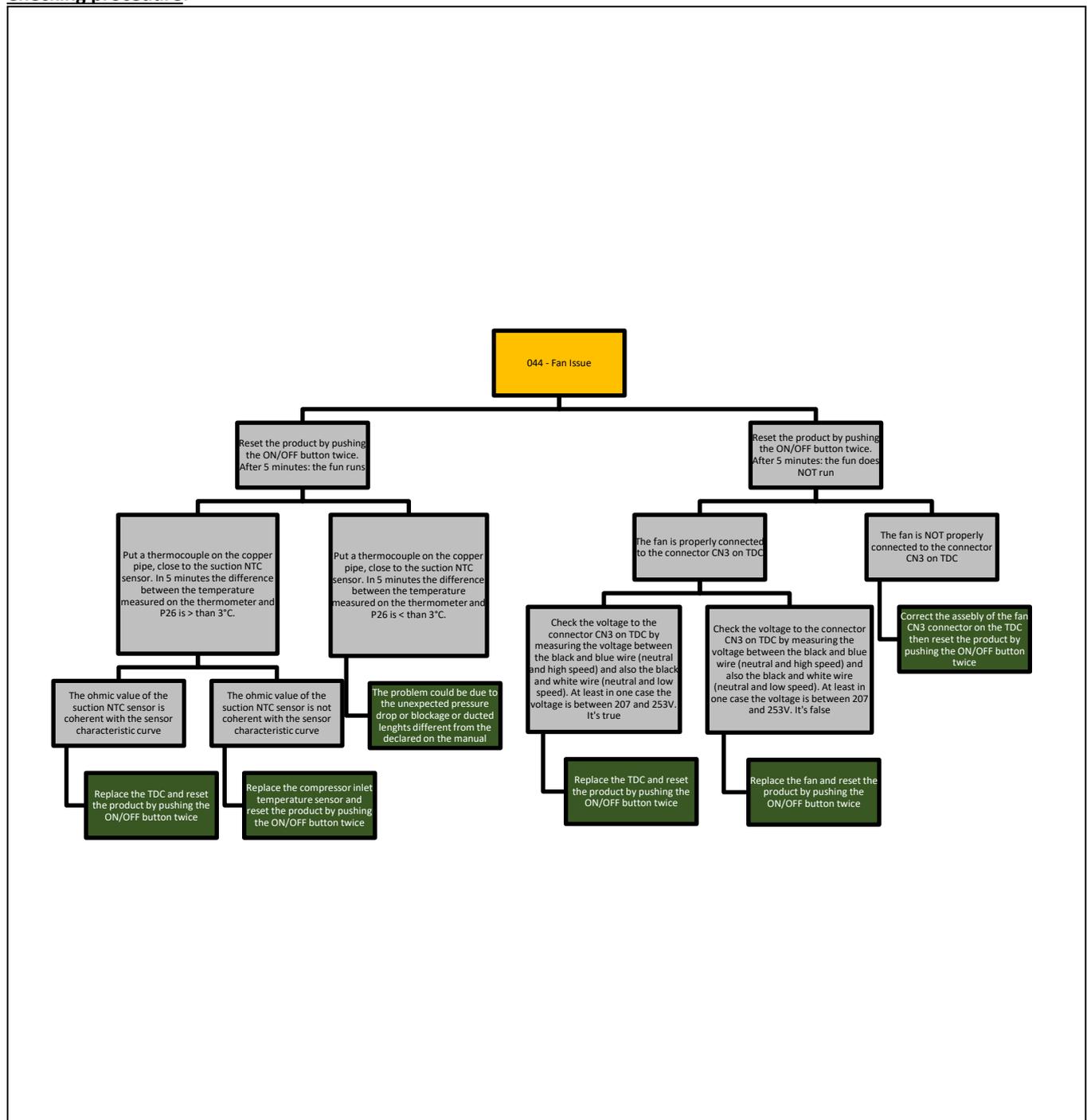
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- Suction NTC sensor;
- TDC board;
- Fan capacitor;
- Fan.

Checking procedure:



12.2.10 - Error 051

Description: Pressure switch KO

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

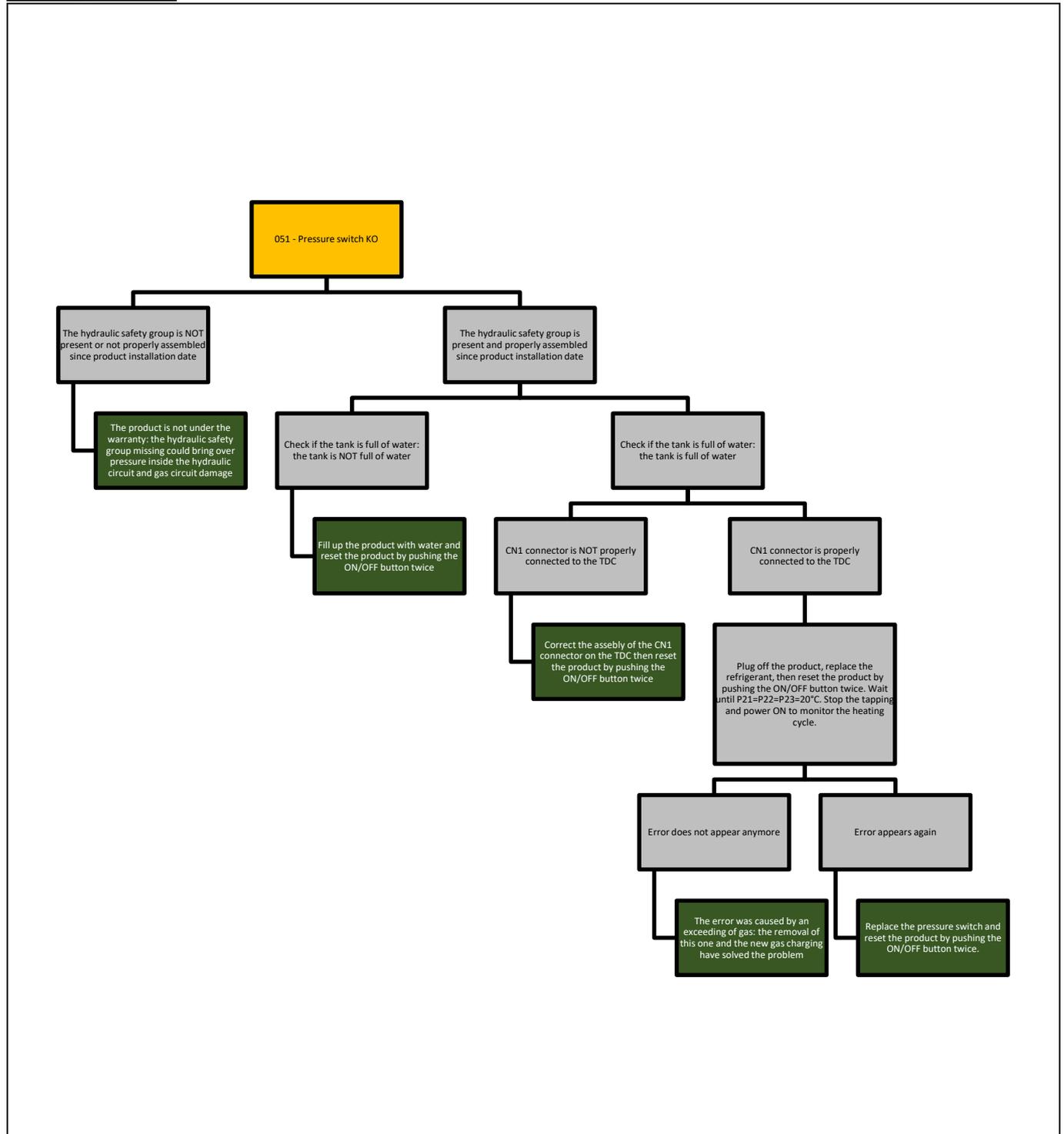
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- Pressure switch.

Checking procedure:



12.2.11 - Error 053

Description: Compressor Thermal Protector: KO

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

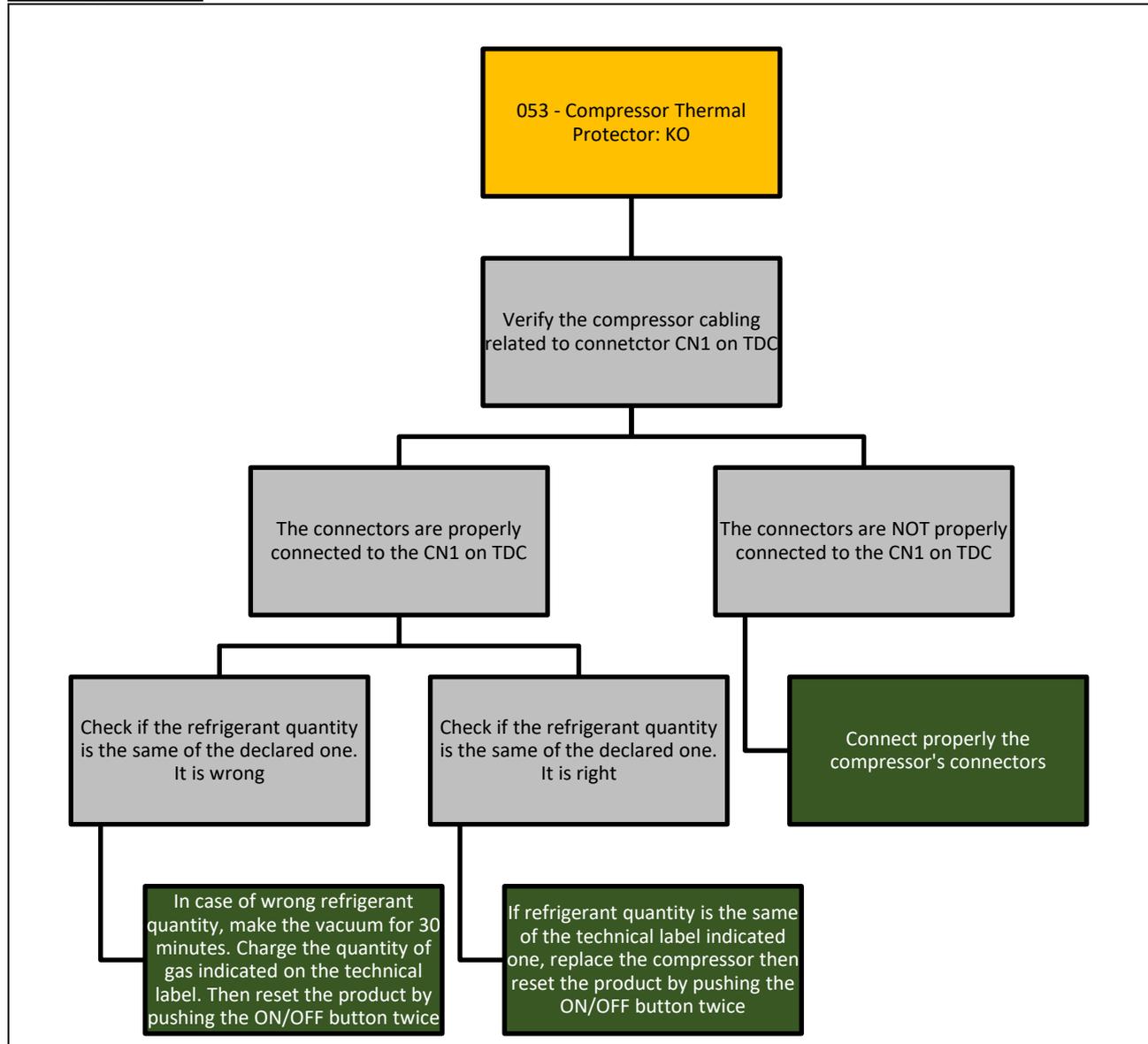
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- Not applicable (hidden error).

Checking procedure:



12.2.12 - Error 081

Description: - Electronic Expansion Valve Issue

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

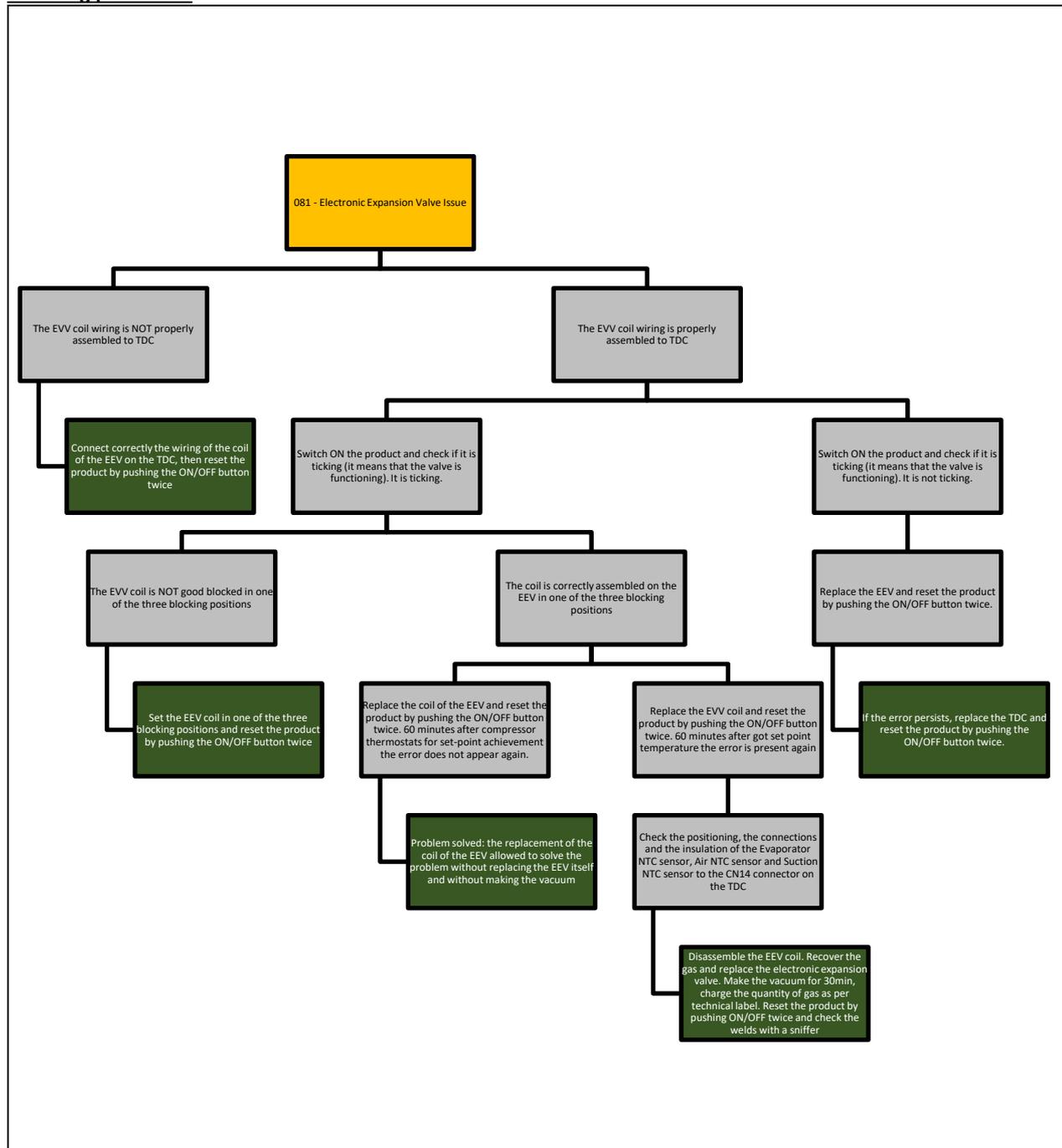
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- Electronic Expansion Valve;
- TDC board.

Checking procedure:



12.2.13 - Error 218

Description: Dome NTC sensor (hot water): Open or Short Circuit

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

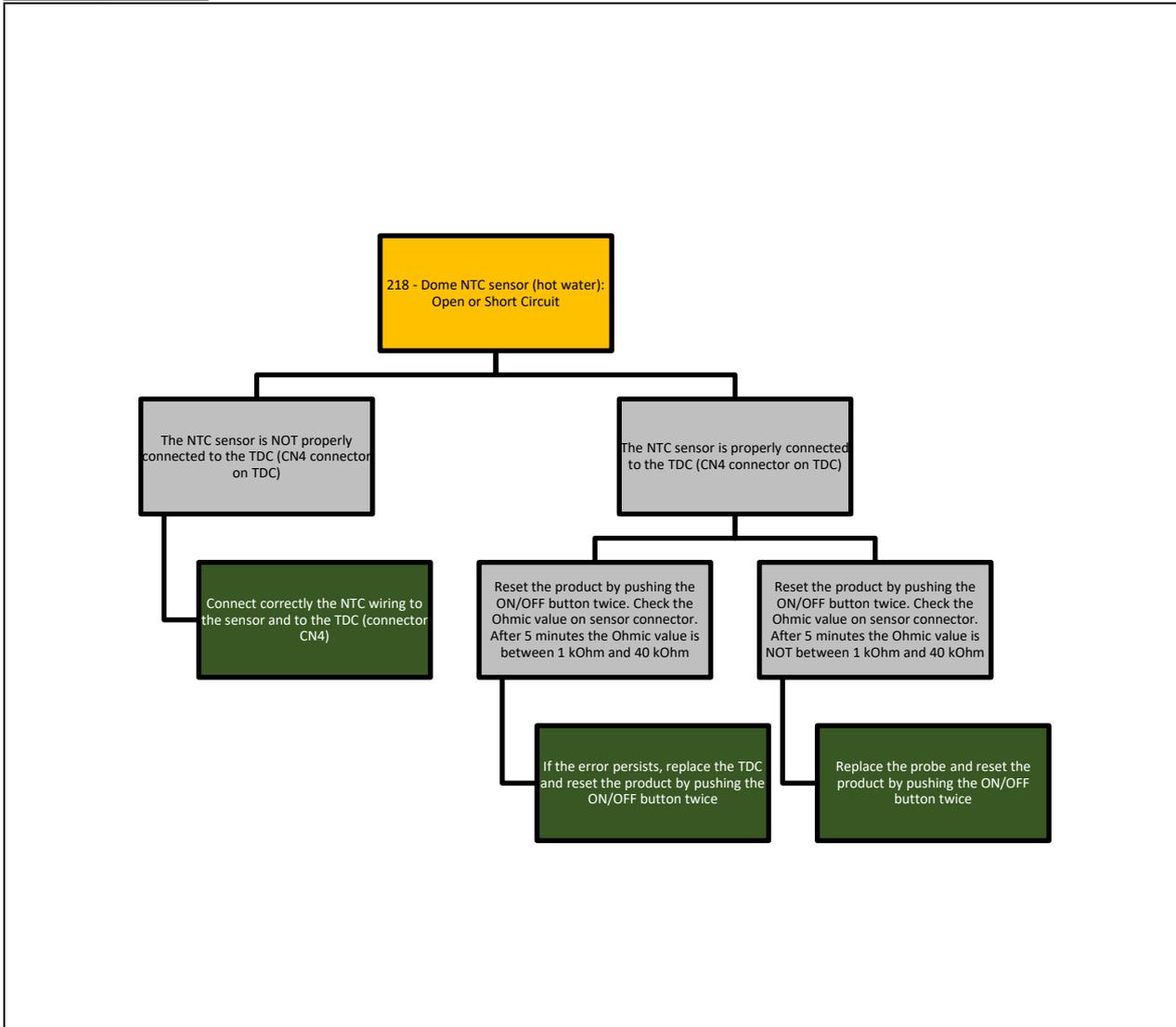
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- Dome NTC sensor (hot water);
- TDC board.

Checking procedure:



NTC Conversion Table

10k Table: Tdome, Thigh, Tlow, Tair, Tdischarge, Tcondenser

°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm
-40	188.5	-19	64.9	2	25.17	23	10.78	44	5.09	65	2.59	86	1.41	107	0.82
-39	179.62	-18	62.03	3	24.12	24	10.38	45	4.92	66	2.51	87	1.37	108	0.80
-38	170.74	-17	59.15	4	23.07	25	10.00	46	4.75	67	2.44	88	1.34	109	0.78
-37	161.86	-16	56.28	5	22.02	26	9.63	47	4.60	68	2.36	89	1.30	110	0.76
-36	152.98	-15	53.41	6	21.12	27	9.28	48	4.45	69	2.29	90	1.27	111	0.74
-35	144.1	-14	51.22	7	20.27	28	8.95	49	4.30	70	2.23	91	1.23	112	0.72
-34	137.54	-13	49.03	8	19.45	29	8.62	50	4.16	71	2.16	92	1.20	113	0.70
-33	130.98	-12	46.85	9	18.67	30	8.31	51	4.03	72	2.10	93	1.17	114	0.69
-32	124.42	-11	44.66	10	17.93	31	8.02	52	3.90	73	2.04	94	1.14	115	0.67
-31	117.86	-10	42.47	11	17.21	32	7.73	53	3.77	74	1.98	95	1.11	116	0.66
-30	111.3	-9	40.76	12	16.53	33	7.46	54	3.65	75	1.92	96	1.08	117	0.64
-29	106.33	-8	39.04	13	15.89	34	7.20	55	3.54	76	1.87	97	1.05	118	0.63
-28	101.35	-7	37.33	14	15.27	35	6.95	56	3.42	77	1.82	98	1.03	119	0.61
-27	96.38	-6	35.61	15	14.67	36	6.71	57	3.32	78	1.77	99	1.00	120	0.60
-26	91.4	-5	33.9	16	14.11	37	6.48	58	3.21	79	1.72	100	0.97	121	0.58
-25	86.43	-4	32.57	17	13.57	38	6.25	59	3.11	80	1.67	101	0.95	122	0.57
-24	82.7	-3	31.24	18	13.05	39	6.04	60	3.01	81	1.62	102	0.93	123	0.56
-23	78.97	-2	29.92	19	12.55	40	5.83	61	2.92	82	1.58	103	0.90	124	0.54
-22	75.23	-1	28.6	20	12.08	41	5.64	62	2.83	83	1.53	104	0.88	125	0.53
-21	71.5	0	27.28	21	11.63	42	5.45	63	2.75	84	1.49	105	0.86		
-20	67.77	1	26.23	22	11.19	43	5.26	64	2.67	85	1.45	106	0.84		

12.2.14 - Error 230

Description: Bottom water temperature sensor: short or open circuit

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

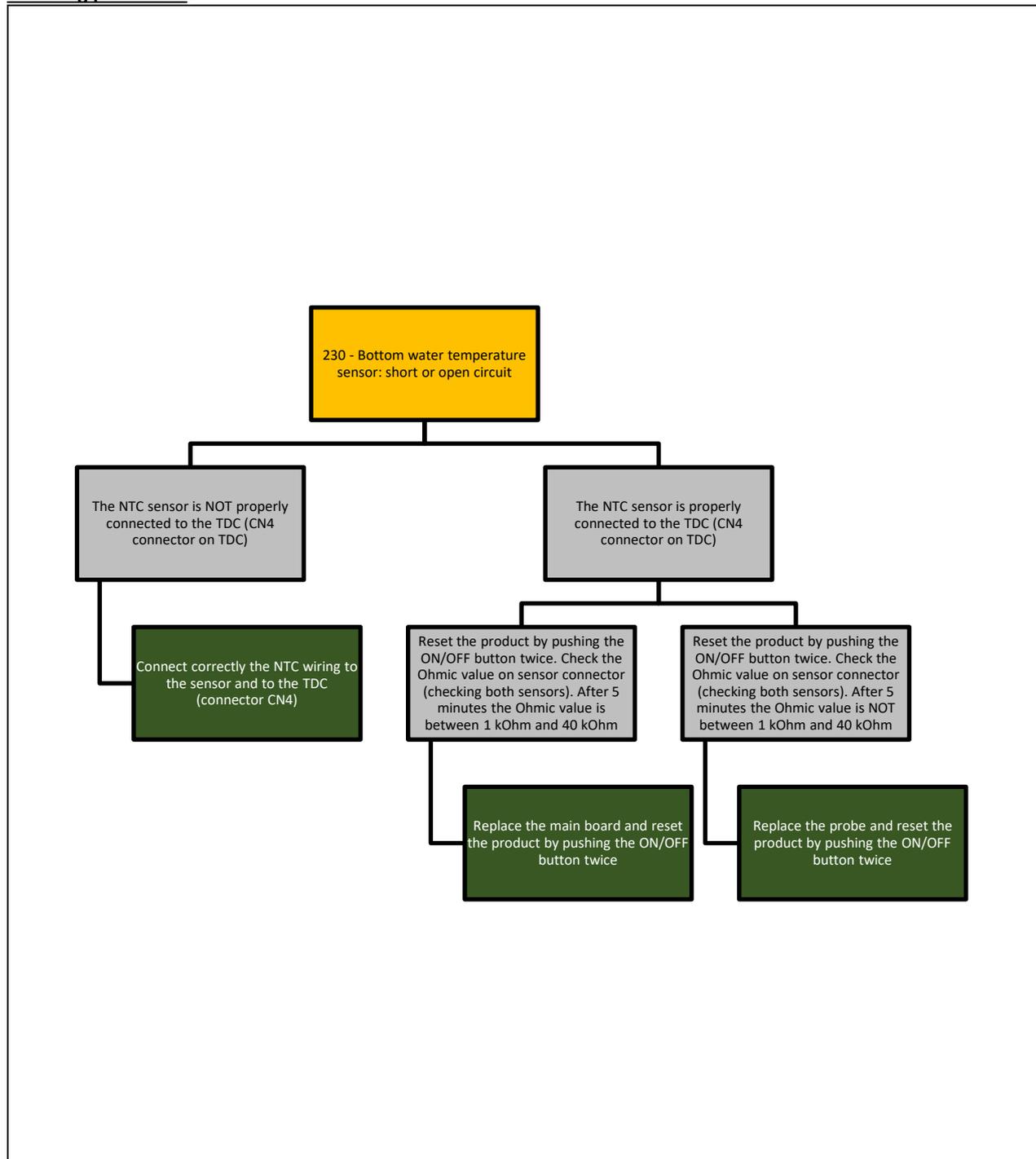
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- Bottom water temperature sensor;
- Mainboard.

Checking procedure:



Water sensor Conversion Table

°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm
-40	188.5	-19	64.9	2	25.17	23	10.78	44	5.09	65	2.59	86	1.41	107	0.82
-39	179.62	-18	62.03	3	24.12	24	10.38	45	4.92	66	2.51	87	1.37	108	0.80
-38	170.74	-17	59.15	4	23.07	25	10.00	46	4.75	67	2.44	88	1.34	109	0.78
-37	161.86	-16	56.28	5	22.02	26	9.63	47	4.60	68	2.36	89	1.30	110	0.76
-36	152.98	-15	53.41	6	21.12	27	9.28	48	4.45	69	2.29	90	1.27	111	0.74
-35	144.1	-14	51.22	7	20.27	28	8.95	49	4.30	70	2.23	91	1.23	112	0.72
-34	137.54	-13	49.03	8	19.45	29	8.62	50	4.16	71	2.16	92	1.20	113	0.70
-33	130.98	-12	46.85	9	18.67	30	8.31	51	4.03	72	2.10	93	1.17	114	0.69
-32	124.42	-11	44.66	10	17.93	31	8.02	52	3.90	73	2.04	94	1.14	115	0.67
-31	117.86	-10	42.47	11	17.21	32	7.73	53	3.77	74	1.98	95	1.11	116	0.66
-30	111.3	-9	40.76	12	16.53	33	7.46	54	3.65	75	1.92	96	1.08	117	0.64
-29	106.33	-8	39.04	13	15.89	34	7.20	55	3.54	76	1.87	97	1.05	118	0.63
-28	101.35	-7	37.33	14	15.27	35	6.95	56	3.42	77	1.82	98	1.03	119	0.61
-27	96.38	-6	35.61	15	14.67	36	6.71	57	3.32	78	1.77	99	1.00	120	0.60
-26	91.4	-5	33.9	16	14.11	37	6.48	58	3.21	79	1.72	100	0.97	121	0.58
-25	86.43	-4	32.57	17	13.57	38	6.25	59	3.11	80	1.67	101	0.95	122	0.57
-24	82.7	-3	31.24	18	13.05	39	6.04	60	3.01	81	1.62	102	0.93	123	0.56
-23	78.97	-2	29.92	19	12.55	40	5.83	61	2.92	82	1.58	103	0.90	124	0.54
-22	75.23	-1	28.6	20	12.08	41	5.64	62	2.83	83	1.53	104	0.88	125	0.53
-21	71.5	0	27.28	21	11.63	42	5.45	63	2.75	84	1.49	105	0.86		
-20	67.77	1	26.23	22	11.19	43	5.26	64	2.67	85	1.45	106	0.84		

12.2.15 - Error 231

Description: Water Temperature sensor (Heating Element Zone): safety intervention (1st level).

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

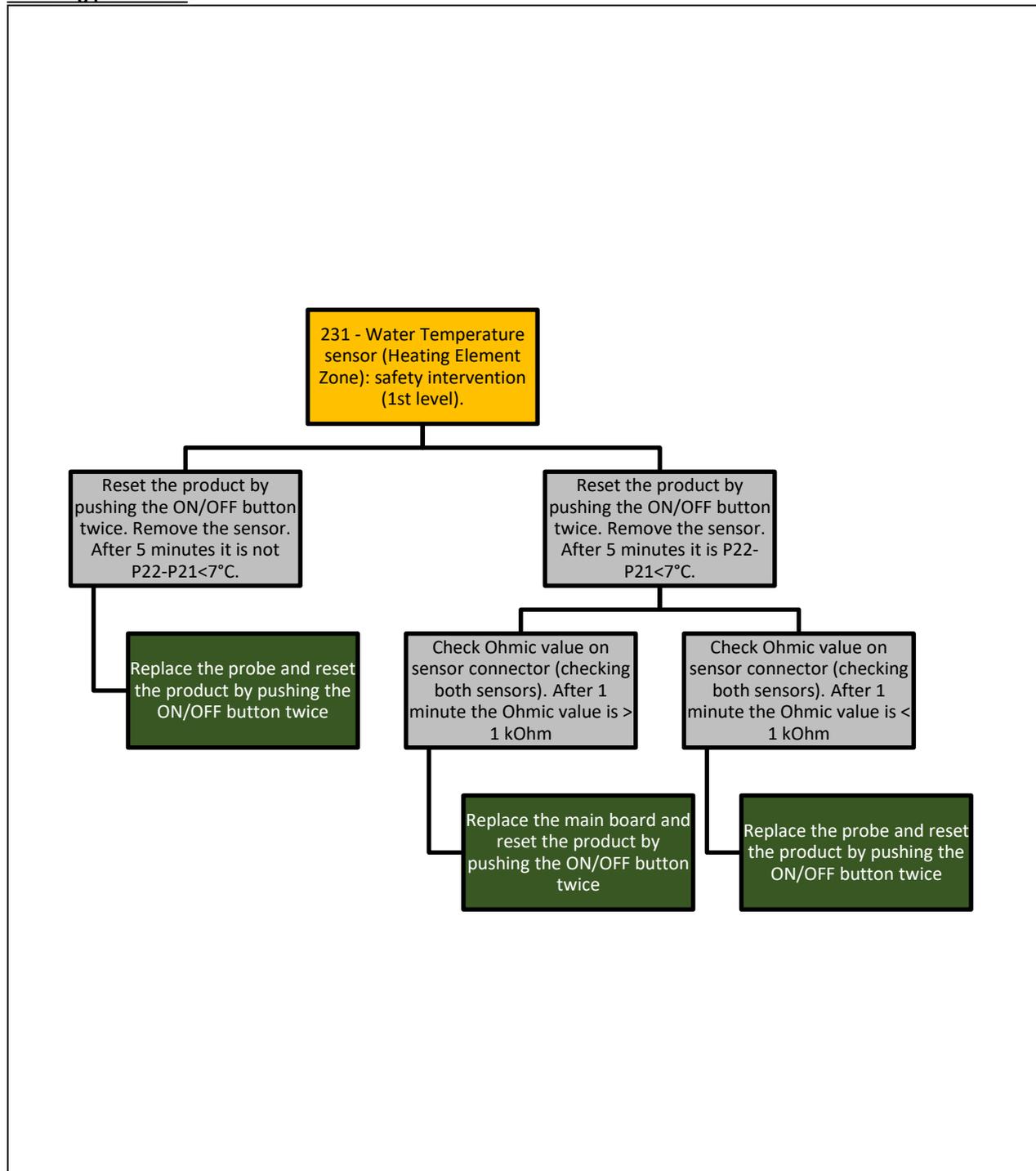
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- Water temperature sensor;
- Mainboard.

Checking procedure:



Water sensor Conversion Table

°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm
-40	188.5	-19	64.9	2	25.17	23	10.78	44	5.09	65	2.59	86	1.41	107	0.82
-39	179.62	-18	62.03	3	24.12	24	10.38	45	4.92	66	2.51	87	1.37	108	0.80
-38	170.74	-17	59.15	4	23.07	25	10.00	46	4.75	67	2.44	88	1.34	109	0.78
-37	161.86	-16	56.28	5	22.02	26	9.63	47	4.60	68	2.36	89	1.30	110	0.76
-36	152.98	-15	53.41	6	21.12	27	9.28	48	4.45	69	2.29	90	1.27	111	0.74
-35	144.1	-14	51.22	7	20.27	28	8.95	49	4.30	70	2.23	91	1.23	112	0.72
-34	137.54	-13	49.03	8	19.45	29	8.62	50	4.16	71	2.16	92	1.20	113	0.70
-33	130.98	-12	46.85	9	18.67	30	8.31	51	4.03	72	2.10	93	1.17	114	0.69
-32	124.42	-11	44.66	10	17.93	31	8.02	52	3.90	73	2.04	94	1.14	115	0.67
-31	117.86	-10	42.47	11	17.21	32	7.73	53	3.77	74	1.98	95	1.11	116	0.66
-30	111.3	-9	40.76	12	16.53	33	7.46	54	3.65	75	1.92	96	1.08	117	0.64
-29	106.33	-8	39.04	13	15.89	34	7.20	55	3.54	76	1.87	97	1.05	118	0.63
-28	101.35	-7	37.33	14	15.27	35	6.95	56	3.42	77	1.82	98	1.03	119	0.61
-27	96.38	-6	35.61	15	14.67	36	6.71	57	3.32	78	1.77	99	1.00	120	0.60
-26	91.4	-5	33.9	16	14.11	37	6.48	58	3.21	79	1.72	100	0.97	121	0.58
-25	86.43	-4	32.57	17	13.57	38	6.25	59	3.11	80	1.67	101	0.95	122	0.57
-24	82.7	-3	31.24	18	13.05	39	6.04	60	3.01	81	1.62	102	0.93	123	0.56
-23	78.97	-2	29.92	19	12.55	40	5.83	61	2.92	82	1.58	103	0.90	124	0.54
-22	75.23	-1	28.6	20	12.08	41	5.64	62	2.83	83	1.53	104	0.88	125	0.53
-21	71.5	0	27.28	21	11.63	42	5.45	63	2.75	84	1.49	105	0.86		
-20	67.77	1	26.23	22	11.19	43	5.26	64	2.67	85	1.45	106	0.84		

12.2.16 - Error 232

Description: Water Temperature sensor (Heating Element Zone): safety intervention (2nd level).

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

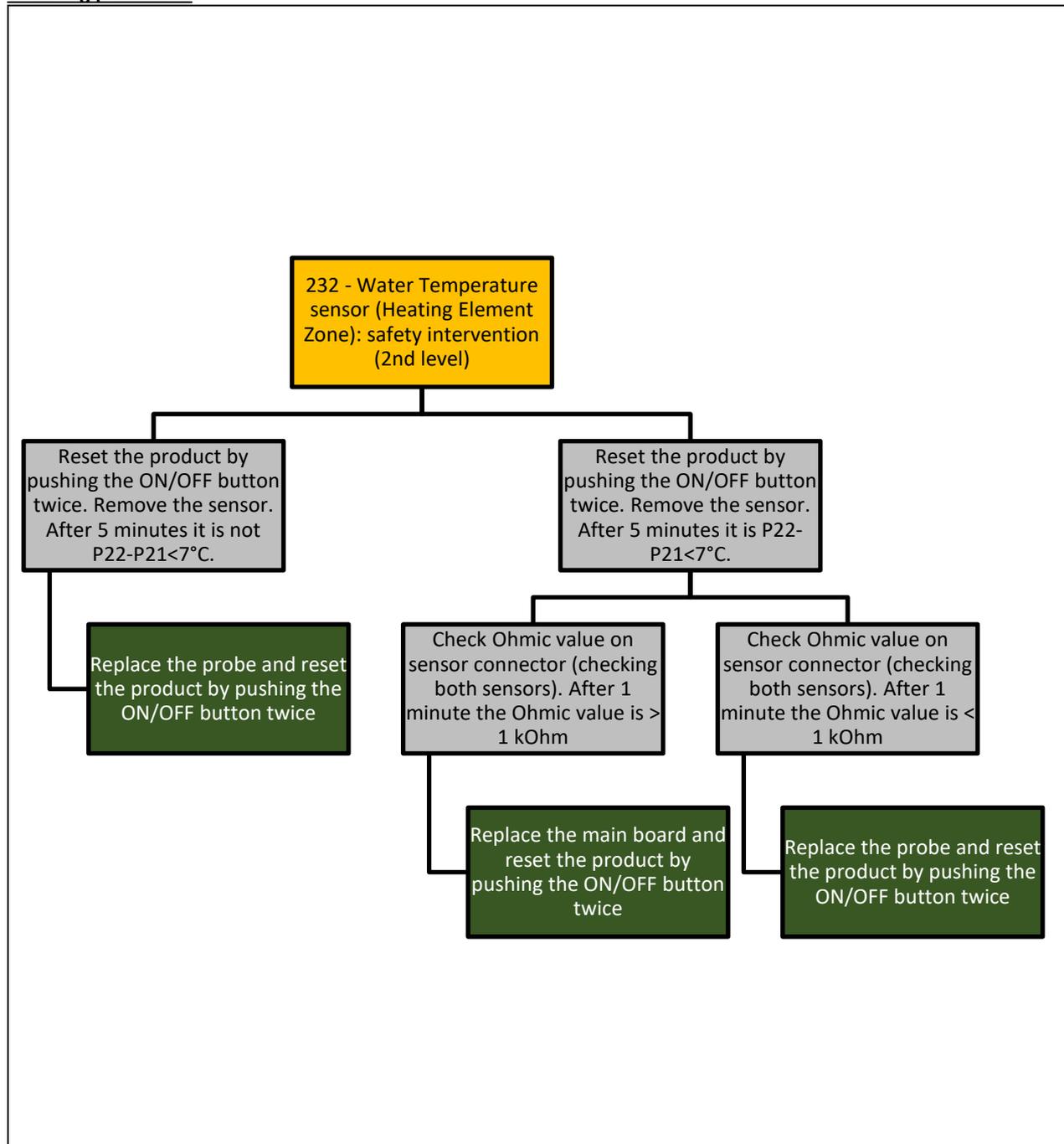
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- Water temperature sensor;
- Mainboard.

Checking procedure:



Water sensor Conversion Table

°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm	°C	kohm
-40	188.5	-19	64.9	2	25.17	23	10.78	44	5.09	65	2.59	86	1.41	107	0.82
-39	179.62	-18	62.03	3	24.12	24	10.38	45	4.92	66	2.51	87	1.37	108	0.80
-38	170.74	-17	59.15	4	23.07	25	10.00	46	4.75	67	2.44	88	1.34	109	0.78
-37	161.86	-16	56.28	5	22.02	26	9.63	47	4.60	68	2.36	89	1.30	110	0.76
-36	152.98	-15	53.41	6	21.12	27	9.28	48	4.45	69	2.29	90	1.27	111	0.74
-35	144.1	-14	51.22	7	20.27	28	8.95	49	4.30	70	2.23	91	1.23	112	0.72
-34	137.54	-13	49.03	8	19.45	29	8.62	50	4.16	71	2.16	92	1.20	113	0.70
-33	130.98	-12	46.85	9	18.67	30	8.31	51	4.03	72	2.10	93	1.17	114	0.69
-32	124.42	-11	44.66	10	17.93	31	8.02	52	3.90	73	2.04	94	1.14	115	0.67
-31	117.86	-10	42.47	11	17.21	32	7.73	53	3.77	74	1.98	95	1.11	116	0.66
-30	111.3	-9	40.76	12	16.53	33	7.46	54	3.65	75	1.92	96	1.08	117	0.64
-29	106.33	-8	39.04	13	15.89	34	7.20	55	3.54	76	1.87	97	1.05	118	0.63
-28	101.35	-7	37.33	14	15.27	35	6.95	56	3.42	77	1.82	98	1.03	119	0.61
-27	96.38	-6	35.61	15	14.67	36	6.71	57	3.32	78	1.77	99	1.00	120	0.60
-26	91.4	-5	33.9	16	14.11	37	6.48	58	3.21	79	1.72	100	0.97	121	0.58
-25	86.43	-4	32.57	17	13.57	38	6.25	59	3.11	80	1.67	101	0.95	122	0.57
-24	82.7	-3	31.24	18	13.05	39	6.04	60	3.01	81	1.62	102	0.93	123	0.56
-23	78.97	-2	29.92	19	12.55	40	5.83	61	2.92	82	1.58	103	0.90	124	0.54
-22	75.23	-1	28.6	20	12.08	41	5.64	62	2.83	83	1.53	104	0.88	125	0.53
-21	71.5	0	27.28	21	11.63	42	5.45	63	2.75	84	1.49	105	0.86		
-20	67.77	1	26.23	22	11.19	43	5.26	64	2.67	85	1.45	106	0.84		

12.2.17 - Error 233

Description: Water Temperature sensor (Heating Element Zone): relay stuck.

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

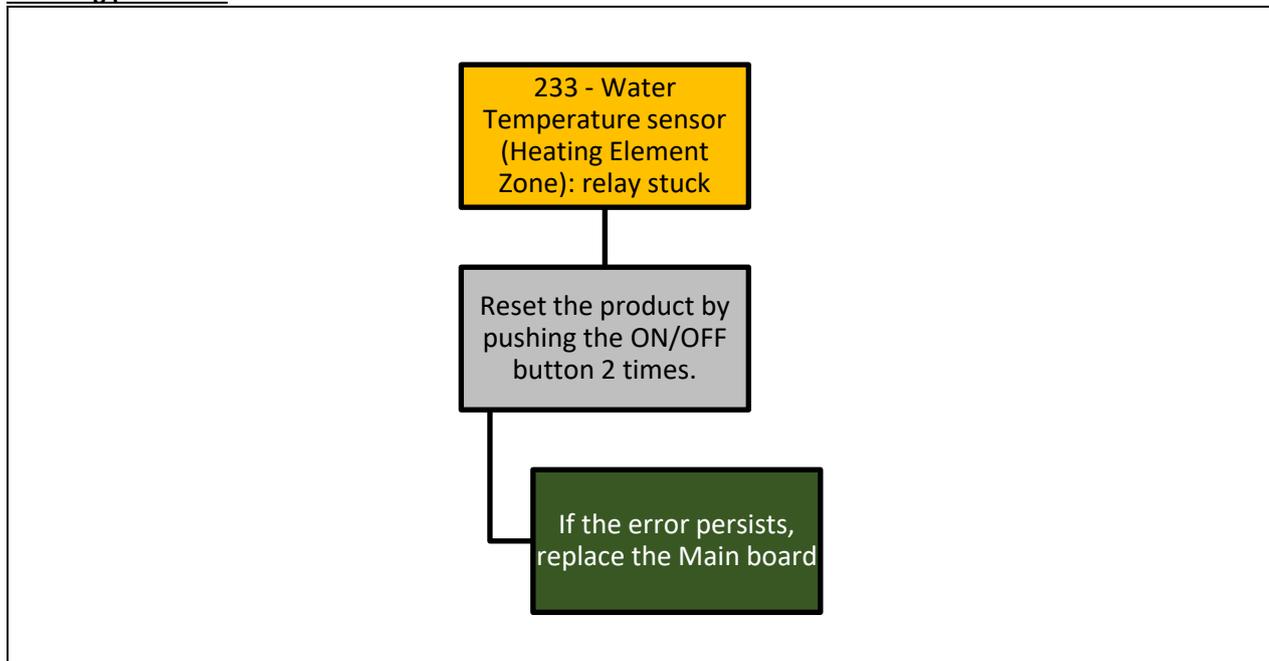
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- Mainboard.

Checking procedure:



12.2.18 - Error 241

Description: Impressed current anode: open circuit.

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

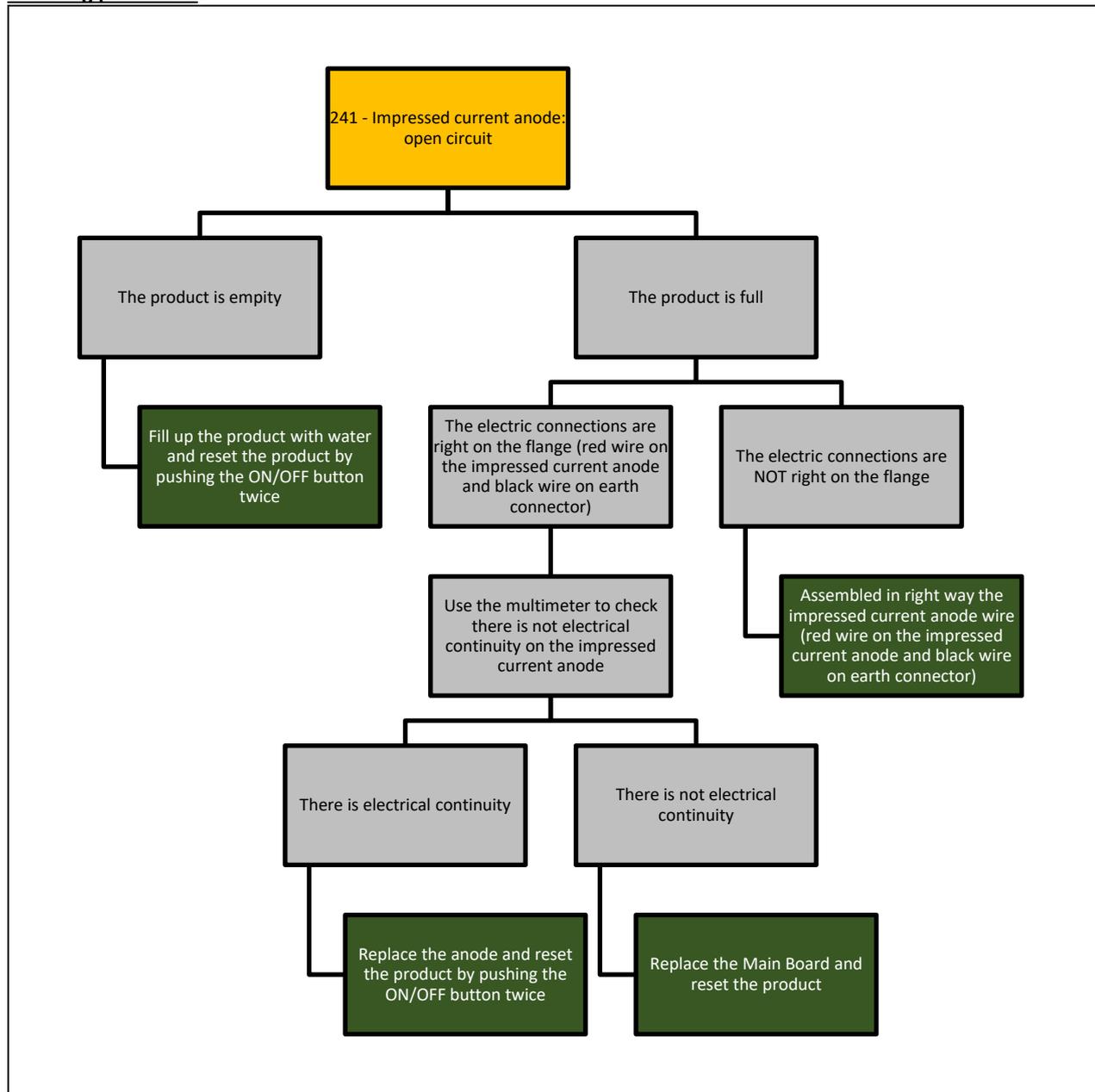
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- Impressed current anode;
- Mainboard.

Checking procedure:



12.2.19 - Error 314

Description: ON/OFF repeated.

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

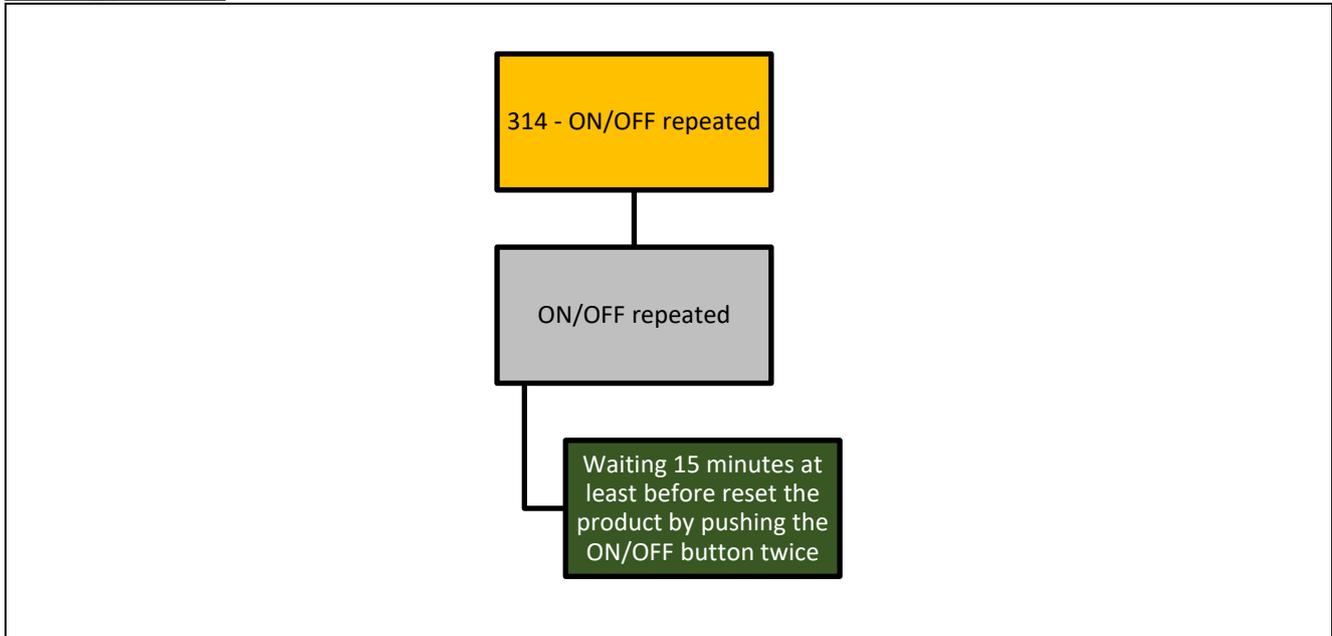
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- Not applicable.

Checking procedure:



12.2.20 - Error 321

Description: Internal Fault (Bad data flash)

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

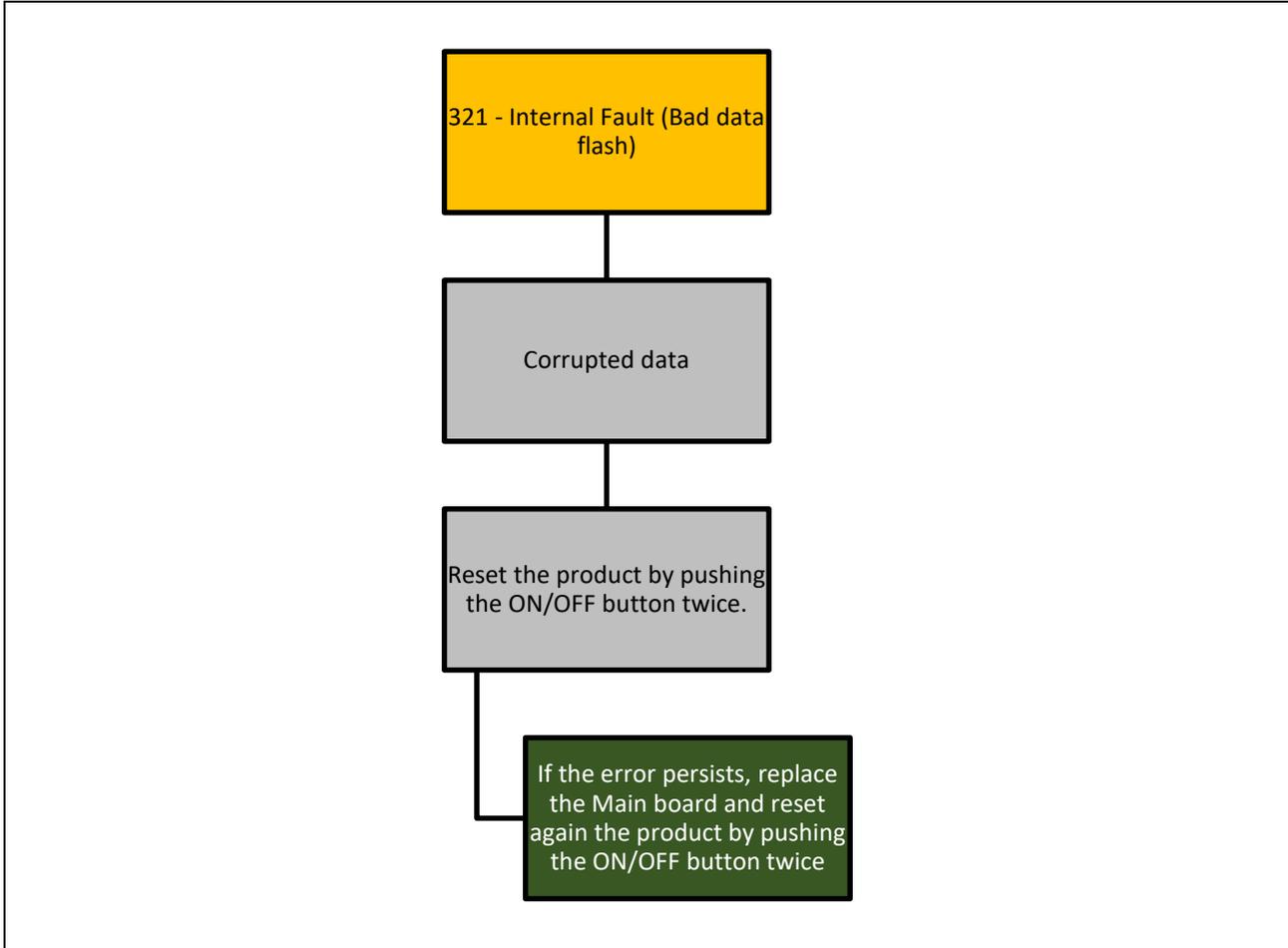
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- Mainboard.

Checking procedure:



12.2.21 - Error 331

Description: Missing communication between main board and display

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

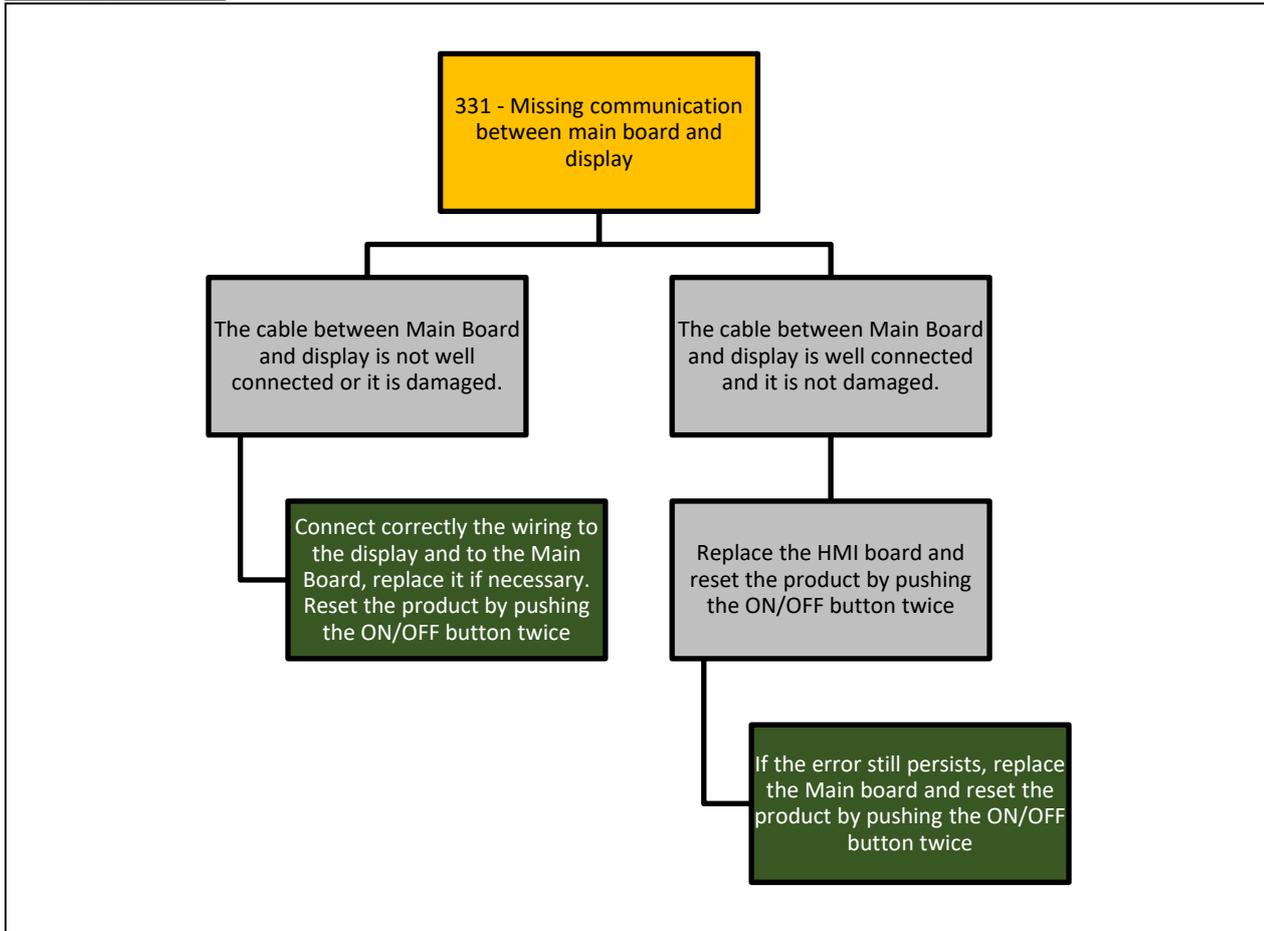
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- Cable between Main board and HMI;
- HMI board;
- Mainboard.

Checking procedure:



12.2.22 - Error 332

Description: Missing communication between Main Board and HMI

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

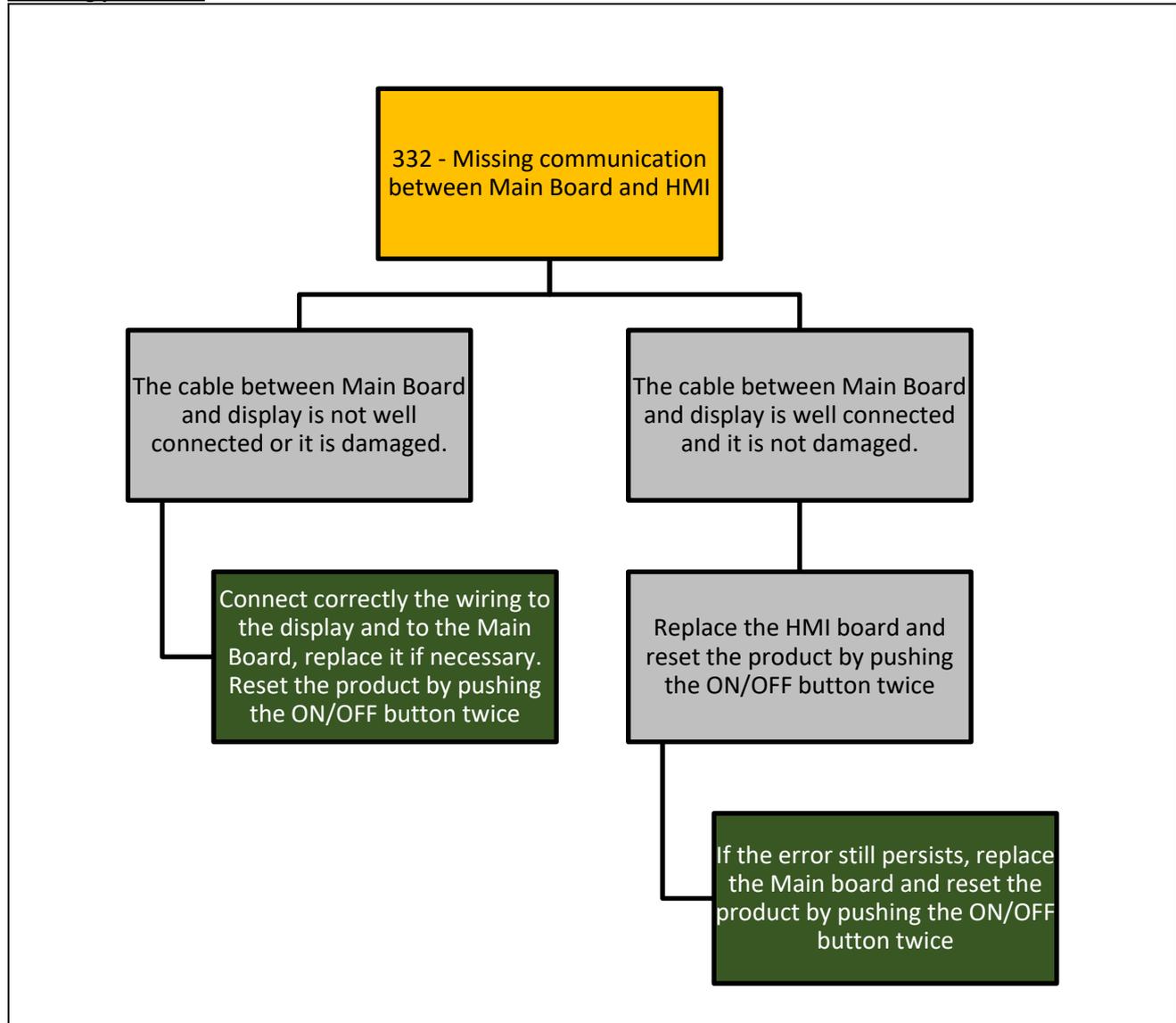
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- Cable between Main board and HMI;
- HMI board;
- Mainboard.

Checking procedure:



12.2.23 - Error 333

Description: Missing communication between Main Board and WiFi Board.

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

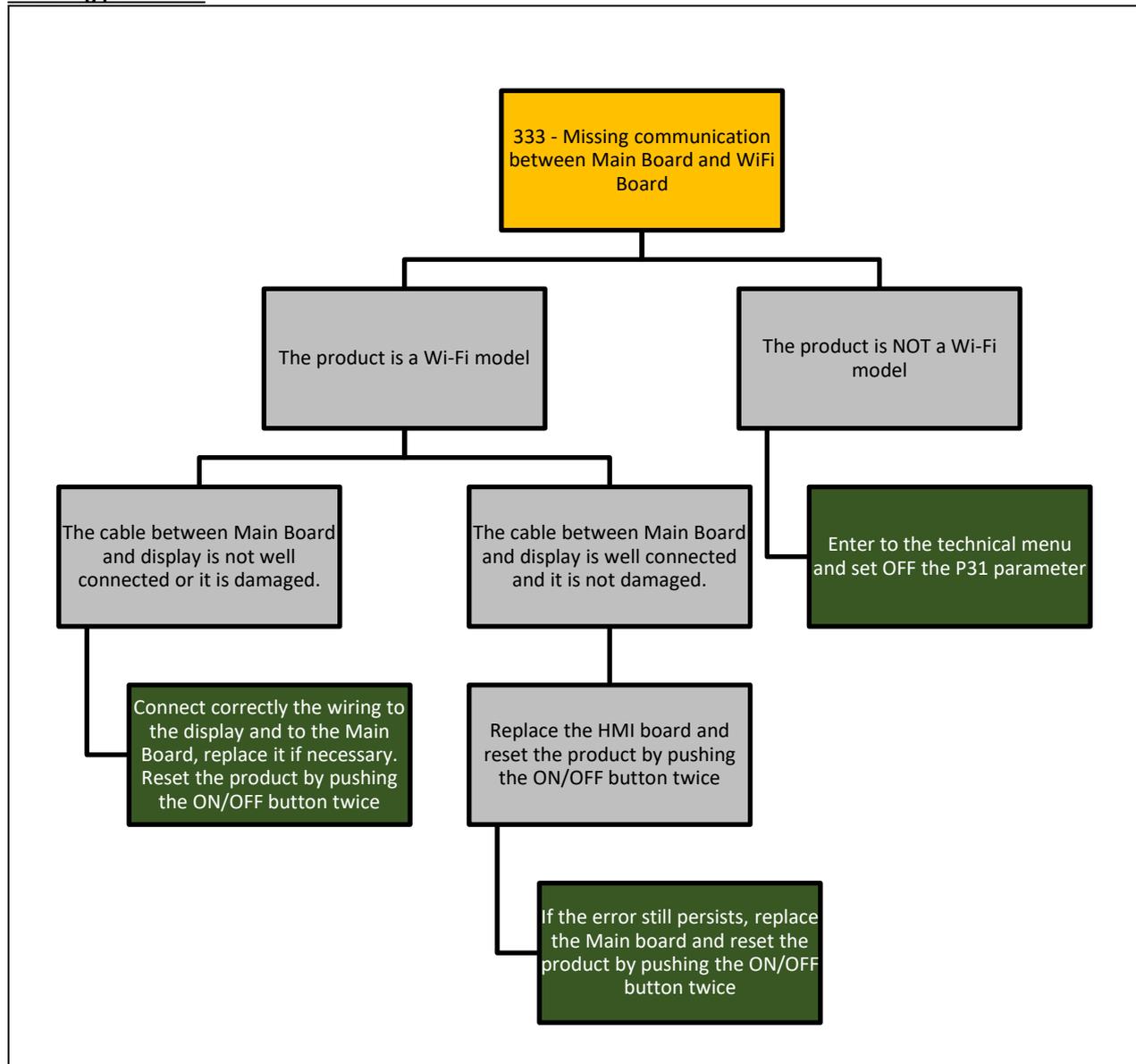
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- Cable/cables between Main board and HMI;
- HMI board;
- Mainboard.

Checking procedure:



12.2.24 - Error 334

Description: Missing Communication between Main Board and TDC

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

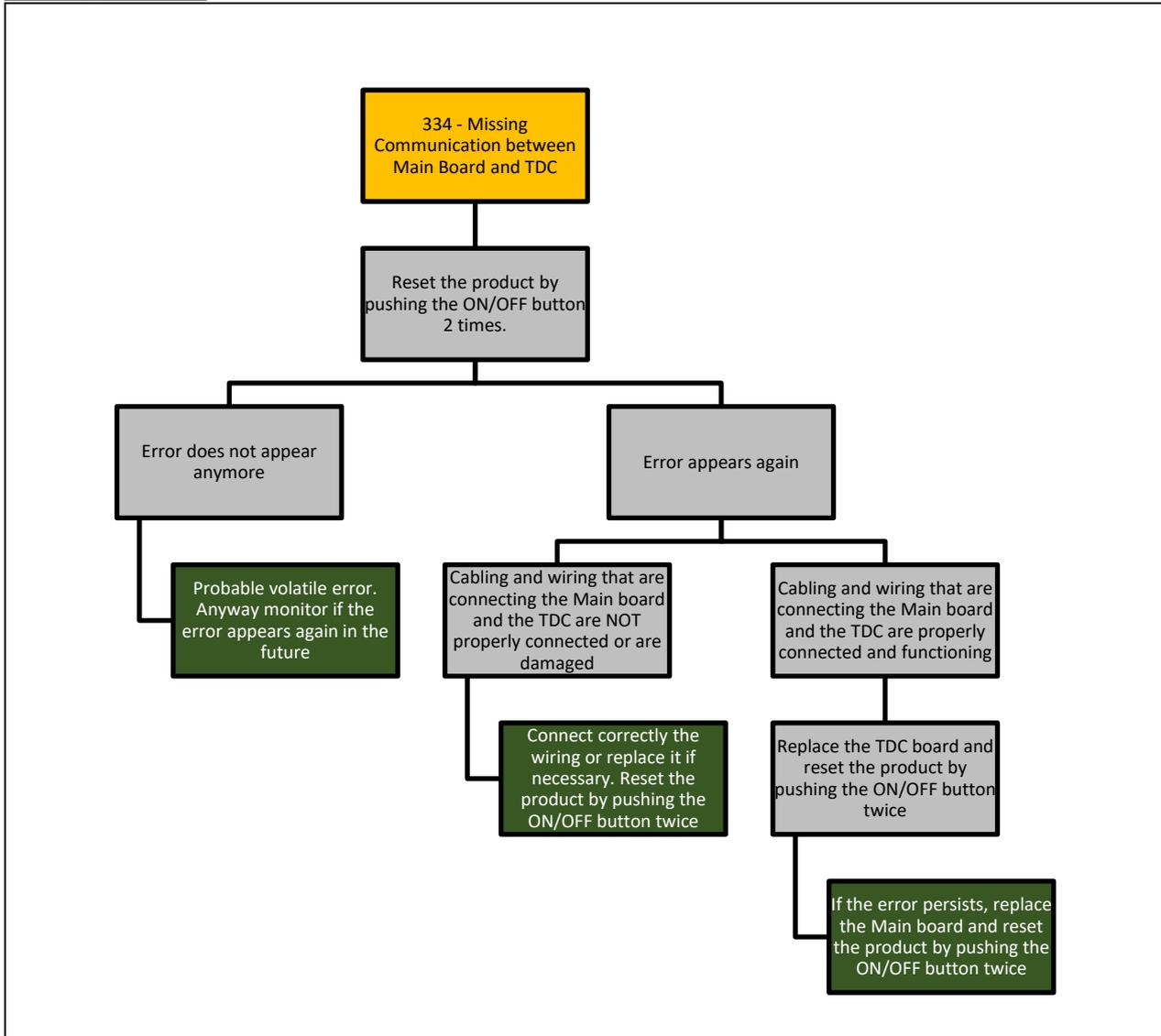
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- Cable/cables between Main board and TDC;
- TDC board;
- Mainboard.

Checking procedure:



12.2.25 - Error 335

Description: Missing Main Board internal communication (safety/comfort).

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

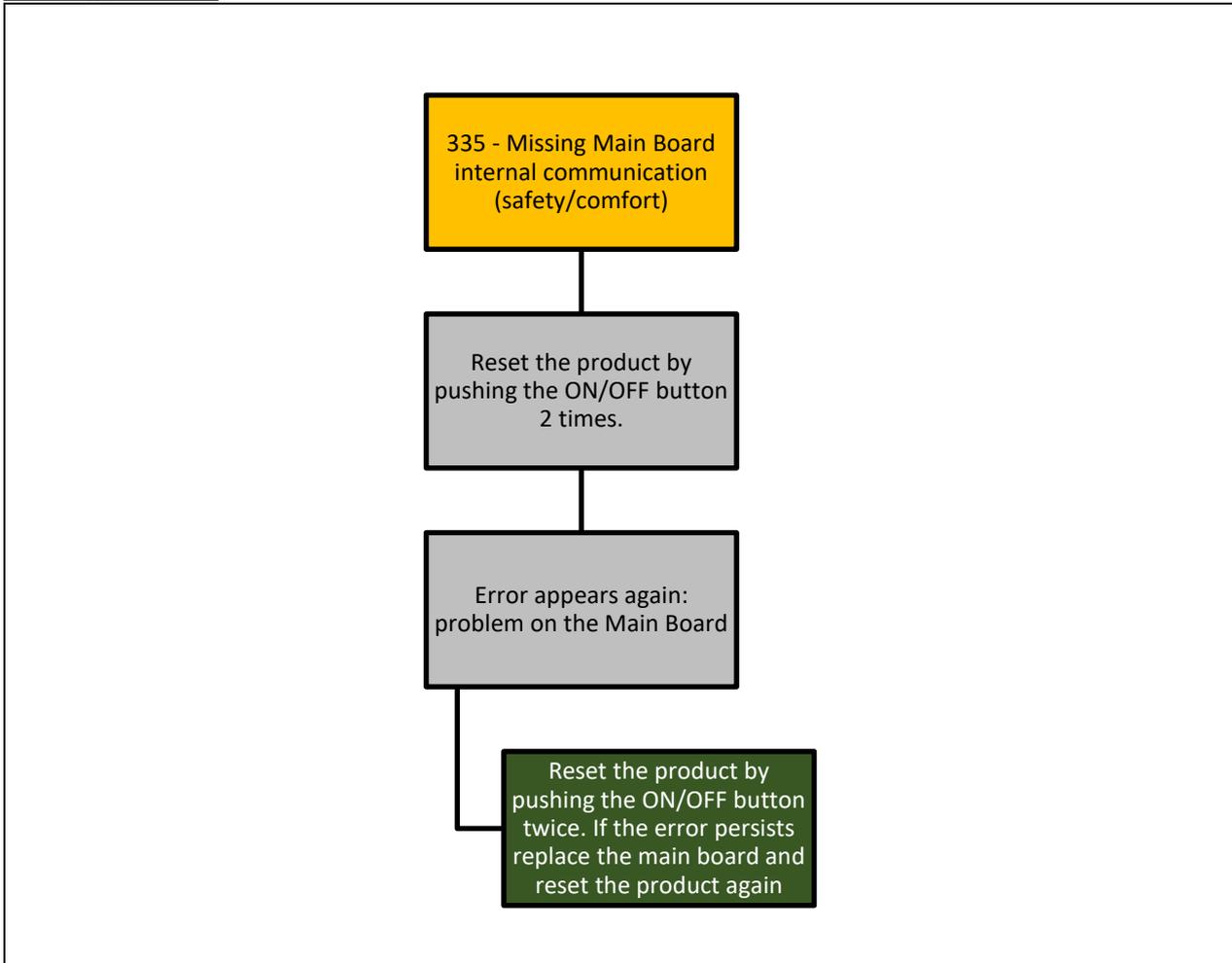
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- Mainboard.

Checking procedure:



12.2.26 - Error 336

Description: Touch screen not working.

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

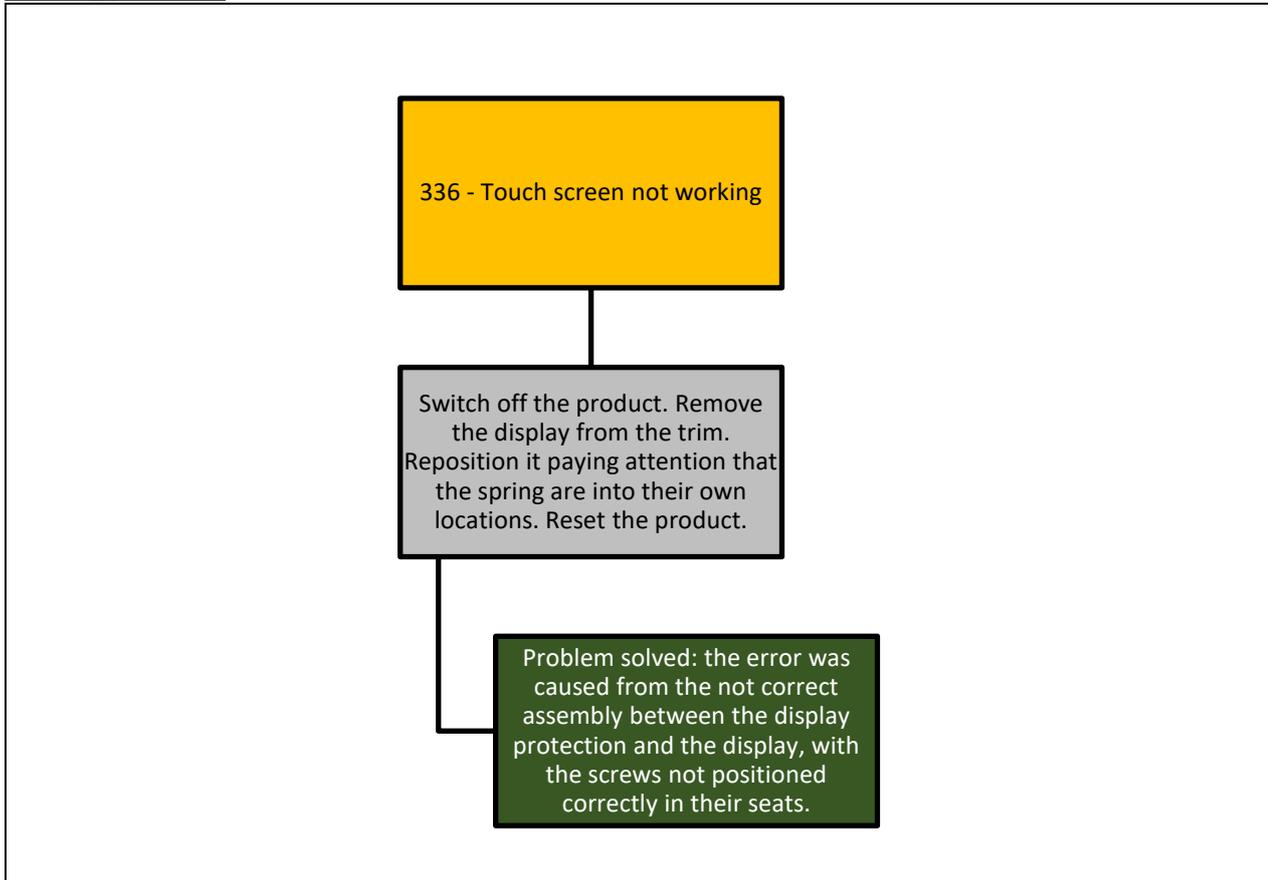
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- HMI board.

Checking procedure:



12.2.27 - Error 337

Description: Cascade master missing.

Preliminary operations: Follow the guideline for preliminary operations explained in par. 12.1.

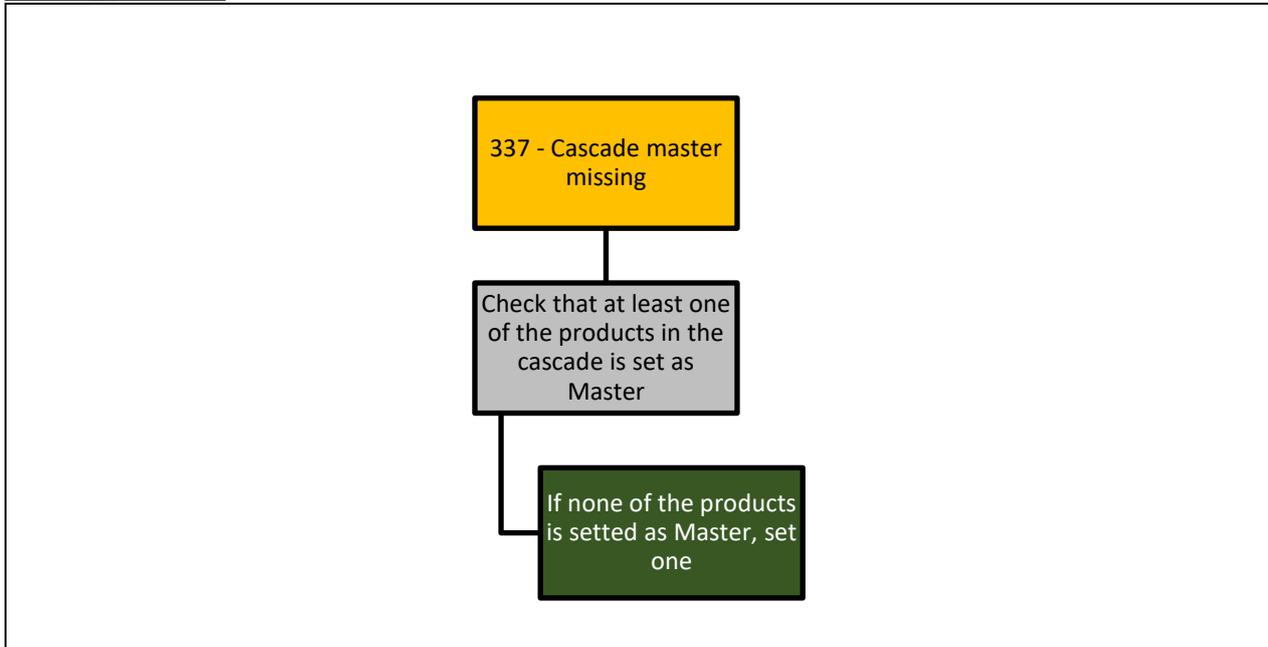
Useful instruments:

- Multimeter with leads;
- Digital thermometer with contact thermocouple (type T).

Useful spare parts:

- Not applicable.

Checking procedure:

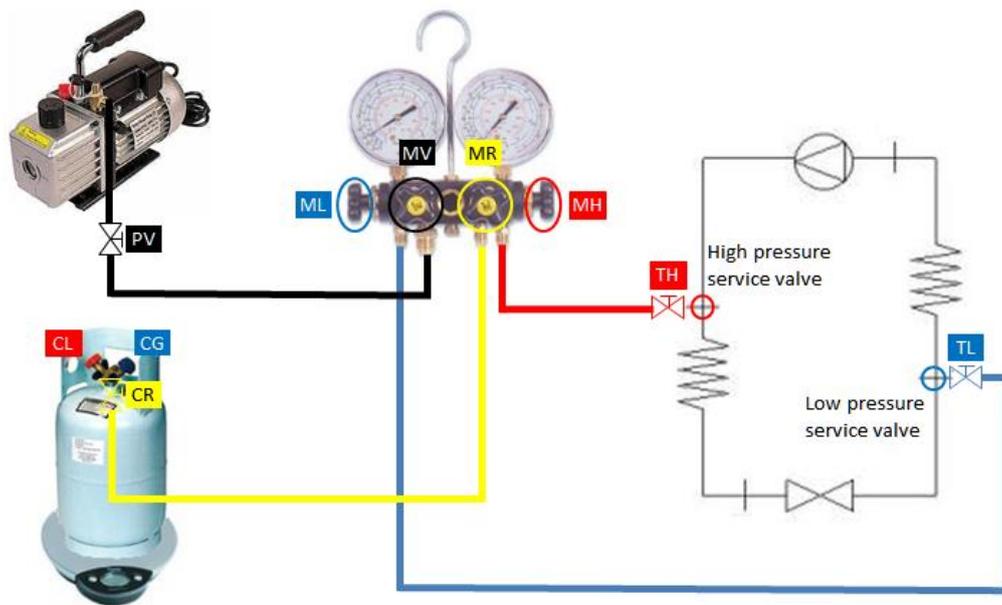


12.3 – Gas R134a Vacuum and Recharge procedure

The procedure has to be performed *after having recovered the residual gas* eventually present into the heat pump circuit.

Required instruments and equipment:

- **Vacuum equipment** (portable vacuum pump)
- **Group with manometers** generally equipped with 4 taps:
 - the blue one to be connected to the low pressure service valve
 - the red one to be connected to the high pressure service valve
 - the “vacuum” one to be connected to the vacuum pump
 - the “refill” one (generally yellow) to be connected to the gas R134a cylinder
- **Flexible pipes with taps**
- **Scale**
- **Gas R134a cylinder** generally equipped with 2 taps:
 - the blue one is for gas R134a in gaseous state (commonly used for more precise charging through the low pressure service valve)
 - the red one is for gas R134a in liquid state (rarely used for faster charging through the high pressure service valve)



Make the vacuum:

- 1) **Connect the flexible pipes with taps** according to the connections scheme layout in the picture (note: all the taps have to be **closed!**)
- 2) **Open the taps ML, MH, MV, MR, TL, TH, PV** (note: CR has to be **closed!**)
- 3) **Switch ON the vacuum pump**, the pressure on the manometers should decrease
... leave the vacuum pump work for at least 30 minutes ...
- 4) **Close the tap PV**
- 5) **Switch OFF the vacuum pump** the pressure on the manometers should **not** change during next 15 minutes!
- 6) **Close the taps ML, MH, MV, MR, TL, TH**
- 7) **Disconnect the flexible pipes with taps from the vacuum pump and the high pressure service valve**

Recharge procedure (through LOW pressure service valve):

- 1) **Put the gas R134a cylinder on the scale**
- 2) **Connect the flexible pipe with tap CR to CG** (note: all the taps have to be **closed!**)
- 3) **Switch on the scale**
- 4) **Open the taps ML, MR, CR, CG** (note: MV, MH, TL have to be **closed!**)
- 5) **Reset the weight on the scale (zero point)**
- 6) **Open the tap TL**
- 7) **Switch ON the appliance** the compressor starts to work, supporting the gas R134a recharge!
- 8) **When the refilled gas (gaseous state) weight is according to the appliance technical label specification, close the tap TL**
- 9) **Close the taps ML, MR, CR, CG**
- 10) **Disconnect all the flexible pipes with taps and switch OFF the scale**

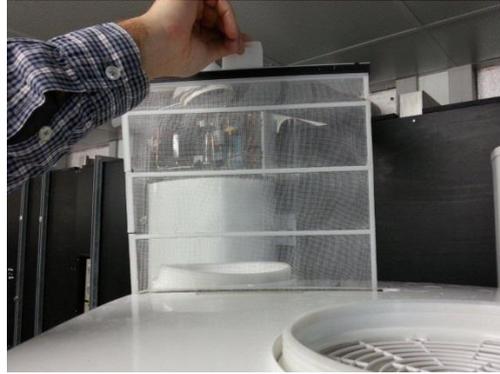
12.4 – Cleaning of the evaporator filter

It is recommended annual cleaning of the evaporator filter to remove dust or obstructions. The filter can be extracted using the appropriate clip. Clean the filter with water and mild soap.

1) Evaporator filter case



1) Extract the evaporator filter



2) Remove the filter cap



If there is not sufficient space over the product, it is possible to bend the filter



Possible Errors: 042 and 044 (refer to troubleshooting par.)

13 – MALFUNCTIONS

Malfunctioning indicates situation of possible customer claim even if no error is displayed on the interface.

Malfunctioning Index
Info missing
Water leakage
Insufficient water temperature
Long heating time
Insufficient water flow
Boiling water or steam from the taps
Noise increases from the unit
Frequent electrical resistance functioning
Bad odor
Bad water quality

	Component	Fault cause → Fault mode	What to check	What to do
Info missing	Display	Damaged wirings → not working	Visual check of the component	If the component is faulty, replace it
		Bad connection of wirings → not working	Verify the correct connection with the mainboard	Place the component in the right position
		Faulty component → break	Check the functionality after a temporary power disconnection from mains	If the component is faulty, replace it
	Main board	Damaged wirings → not working	Visual check of the component	If the component is faulty, replace it
		Bad connection of wirings → not working	Verify the correct connection with the mainboard	Place the component in the right position
		Faulty component → break	Check the functionality after a temporary power disconnection from mains	If the component is faulty, replace it
	Component	Fault cause → Fault mode	What to check	What to do
Water leakage	Condensed water discharge pipe	Drainage hole/drainage pipe obstructed or bad positioning	Visual check	Make a proper installation
	Outlet water pipe	Dielectric connection missing → corrosion	Visual check	Provide dielectric connection
		Wrong pipes tightening → bad connection		Restore connections
	Pro Tech anode	Wrong nut tightening	Visual check	Tight properly the nut
	Flange	Gasket broken → leakage	Visual check	Replace the component
		Wrong flange tightening → leakage	Visual check	Check the flange bolts tightening
	Inlet water pipe	Wrong pipes tightening → bad connection	Visual check	Restore connections
	Safety valve inlet pipe (A drip of water by the device should be considered normal during the heating)	Huge amount of water dripping due to: <ul style="list-style-type: none"> • high water temperature set point • high water network pressure • expansion vessel missing • drainage hole obstructed • drainage pipe broken 	<ul style="list-style-type: none"> • Check the valve tuning and the water network pressure • Check the water discharge 	<ul style="list-style-type: none"> • If necessary install an expansion vessel • Clean the valve hole • Replace the discharge pipe
	Tank	Pro-Tech anode malfunctioning due to low water hardness (<12°F) → corrosion	Verify water leakage	Replace the device if badly damaged. Provide water with proper hardness degree
		Product full of water and power not supplied by mains → corrosion	Verify water leakage	Replace the device if badly damaged. Make a proper installation

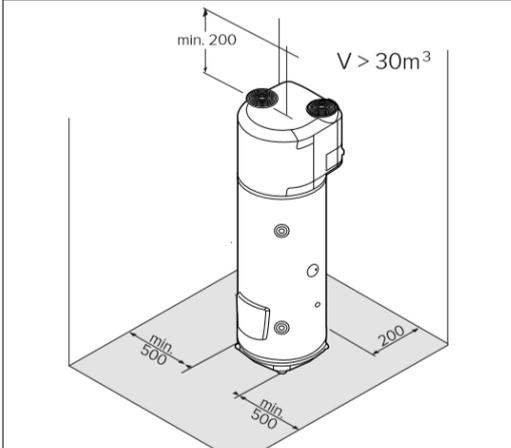
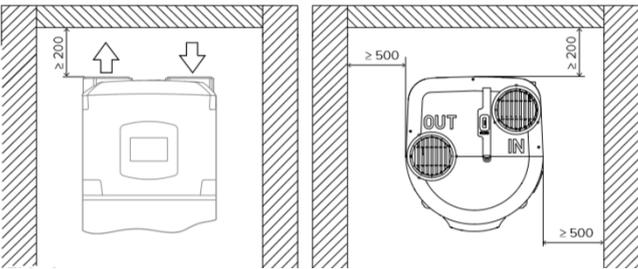
	Component	Fault cause → Fault mode	What to check	What to do
Insufficient water temperature	Product	Product off	Check if the display shows “off” and if there is power from mains	Switch ON the product or Make a proper installation
		Low temperature set	Check the temperature set-point	Increase the value
		Usage of a large amount of hot water when the product is heating up phase		Increase the temperature set point
		Functioning in “Holiday” mode	Verify if this mode is activated	Switch the mode of functioning
		HC/HP installer menu parameter P01 is ON		Keep parameter P01 OFF
	Thermostatic mixing valve (if present)	Faulty component → out of tune	Verify the tuning	Adjust the outlet temperature
	Temperature sensors	Faulty component → out of tune	Verify with a tester that the resistance between terminals is compliant with the “SENSOR TEST TABLE”	If the component is faulty, replace it
		Incorrect positioning	Verify the proper positioning	Place the component in the right position
	Evaporator	Due to ice, leaves, dirt → partially clogged	Visual check of the component	Clean the evaporator filter
	Heating element	Faulty component → break	Verify with a tester that the voltage and the resistance between terminals is not zero	If the component is faulty, replace it
Damaged wirings → not working		Visual check of the component	If the wirings are faulty, replace them	
Bad connection of wirings → not working		Verify the correct connection with the mainboard	Place the component in the right position	
	Component	Fault cause → Fault mode	What to check	What to do
Long heating time		Functioning in “Green” mode in particular cold weather		Set “Comfort” mode
	Hot water, air, evaporator, heating element zone sensors	Faulty component → out of tune	Verify with a tester that the resistance between terminals is compliant with the “SENSOR TEST TABLE”	If the component is faulty, replace it
		Incorrect positioning	Verify the proper positioning	Place the component in the right position
	Evaporator	Wrong components, ducts too long, too many curves → insufficient air flow	Verify the compliance with instruction manual	Make a proper installation
		Due to ice, leaves, dirt → partially clogged	Visual check of the component	Clean evaporator filter and components
	Heating element	Faulty component → break	Verify with a tester that the voltage and the resistance between terminals is not zero	If the component is faulty, replace it
		Damaged wirings → not working	Visual check of the component	If the component is faulty, replace it
		Bad connection of wirings → not working	Verify the correct connection with the mainboard	Place the component in the right position
	Tank	High water hardness with high water temperature set point → limescale	Drain the tank and check the component	Provide water with proper hardness degree or using a water softener
		Component	Fault cause → Fault mode	What to check
Insufficient water flow		Low pressure of water network	Check the cold water network pressure is over 1-2 bar.	-
	Inlet pipe water deflector	Faulty component → break	Drain the tank and check the component	If the component is faulty, replace it
		High water hardness → clogged	Drain the tank and check the component. Verify the correct installation conditions	Clean the component. Provide water with proper hardness degree
	Safety valve inlet pipe	Limescale → clogged	Check the component. Verify the correct installation conditions	Clean the component. Provide water with proper hardness degree
		Dirt into network pipe → clogged	Check the component. Verify the correct installation conditions	Clean the component. Provide clean water
		Obstructions by the water circuit	Water leakage	Make a proper installation

	Component	Fault cause → Fault mode	What to check	What to do
Boiling water or steam from taps	Heating element zone and hot water sensors	Faulty component → out of tune	Verify with a tester that the resistance between terminals is compliant with the "SENSOR TEST TABLE"	If the component is faulty, replace it
		Incorrect positioning	Verify the proper positioning	Place the component in the right position
		High level of scaling in the boiler and components	Drain the tank and check the component	Provide water with proper hardness degree
	Mainboard	Faulty component → malfunctioning	Check if the water heating doesn't stop even if the set point temperature is reached	If the component is faulty, replace it
	Component	Fault cause → Fault mode	What to check	What to do
Noise increases from the unit		Components vibration	Check the components fixed with screws and the rubber feet.	Be sure that the screws are tight
	Fan	Physical impediments to the movement of fan blades → malfunction	Visual check of the component	Clean the component
	Evaporator	Due to ice, leafs, dirt → partially clogged	Visual check of the component	Clean the evaporator filter and component
	Component	Fault cause → Fault mode	What to check	What to do
Frequent heating element functioning		Air temperature out of range	Verify the compliance of the environmental conditions	
		Are not yet past 8 days from: <ul style="list-style-type: none"> • First time installation • Change of the parameter i-Memory • No power from mains • ANTI_B parameter set to OFF and outside air temperature below 10°C 		Wait 8 days and recheck
	Evaporator	Due to ice, leafs, dirt → partially clogged	Visual check of the component	Clean the evaporator filter and component
	Heating element zone, air, evaporator and hot water sensors	Faulty component → out of tune	Verify with a tester that the resistance between terminals is compliant with the "SENSOR TEST TABLE"	If the component is faulty, replace it
		Incorrect positioning	Verify the proper positioning	Place the component in the right position
	Fan	Physical impediments to the movement of fan blades → malfunction	Visual check of the component	Clean the component
	Component	Fault cause → Fault mode	What to check	What to do
Bad odour		No tapping for a long time (with cold water)	-	Big tapping
	Component	Fault cause → Fault mode	What to check	What to do
Bad water quality	Outlet water pipe	Dielectric connection missing → corrosion	Verify the presence of the connection	Clean the pipe and provide a dielectric connection

For other problems please contact local technical assistance.

APPENDIX A: INSTALLATION SITE INSPECTION

General rules	
Are the installation sites, the electrical and hydraulic systems to which the appliance must be connected, fully in compliance with the regulations in force?	<input type="checkbox"/>
Does the installation site have the proper hygienic conditions in relation to the lighting, aeration, solidity?	<input type="checkbox"/>
Are planned for the unit a holding area near the workplace and appropriate protective measures before the installation?	<input type="checkbox"/>
There is a dislocation of the material and equipment that makes it easy and safe to handle? Are avoided the piles that may be subject to falls?	<input type="checkbox"/>
In case of lifting: <ul style="list-style-type: none"> • Is expected the use of cranes or hoists that ensures stability in relationship with the weight of the load? • Is planned a position where drive the lifting that will ensure the view of the area of the lifting path? • Is planned a delimitation of the area, where the operation will take place, in order to avoid the presence of people under the lifted load? 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Device placing	
<p>The product is designed for indoor use;</p> <ul style="list-style-type: none"> • Does the place avoid the frost? • Does the place avoid direct sunlight (even when windows are present)? • Is the place free of acid vapours, dust or gases? 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<ul style="list-style-type: none"> • Does the floor support the weight of an installed product full of water? • Does the site allow the installation of the product with all the hydraulic, electric and air connection? 	<input type="checkbox"/> <input type="checkbox"/>
	
<p>WARNING! A type of canalization not suitable affects product performance and significantly increases the heating time!</p>	
<p>Please bear in mind that using air from heated environments may hamper the building's thermal performance. There is one connection for the air intake and one for the air exhaust on the rear side of the appliance. Important: do not remove, break or tamper in any way with the air inlet and outlet grilles.</p>	

If operation by exhaust or intake to the outside (or another room) of the treated air by the heat pump is foreseen, suitable ducting must be used for air passage.

IMPORTANT: we recommend using insulated pipes to avoid the formation of condensation.

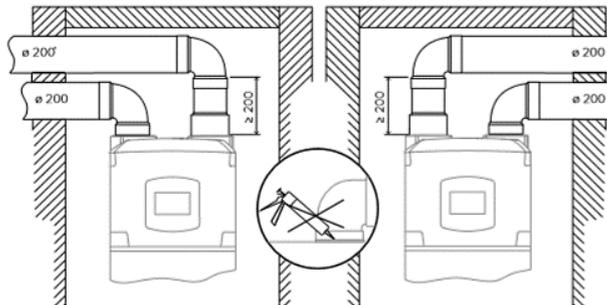
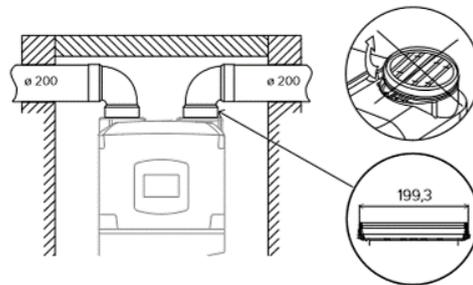
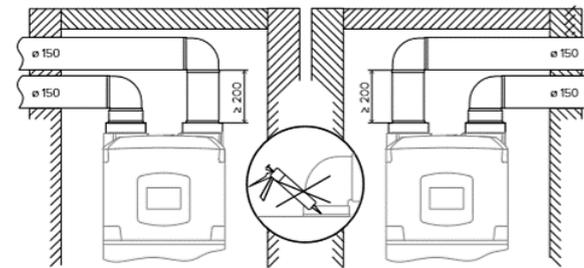
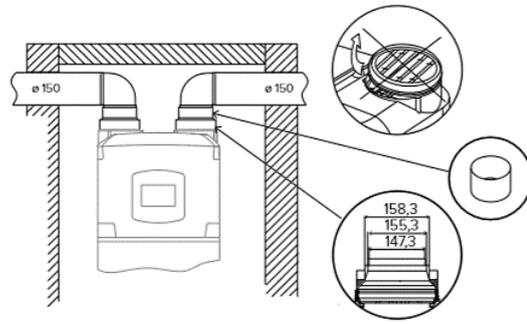
Ensure that the ducting is connected and fastened securely to the product to prevent accidental disconnections and annoying noises. Install the ducts by following all the heights as shown right. Leave a minimum distance between the product and the ducts to allow for the removal of the evaporator filter.

WARNING: Do not use outdoor grills resulting in high losses, such as anti-insect grilles.

The grids used should allow good air flow, the distance between the inlet and outlet air should not be less than 37cm. Protect pipes from the external wind. The expulsion of air in the chimney is allowed only if the draft is appropriate, is also required periodic maintenance of the barrel, and chimney accessories.

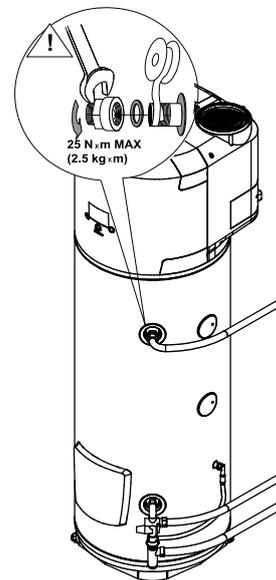
For the maximum length of piping, including the terminal, please refer to the "Typical Configurations" table.

The total static pressure loss due to installation must be lower than the static pressure of the fan (230 Pa).



Typical configurations

Type					
Maximum piping length L1 exhaust + L2 intake	ø150 (PVC)	10 [m]	7 [m]	4 [m]	7 [m]
	ø160 (PEHD)	13 [m]	9 [m]	5 [m]	9 [m]



When a curve is added:

- 90° (PEHD) remove 4 m from the permitted length
- 45° (PEHD) remove 2 m from the permitted length
- 90° (PVC) remove 3 m from the permitted length
- 45° (PVC) remove 1.5 m from the permitted length

Table with minimum ceiling heights for ducted installation

Model	200 l	250 l
ø 150 mm	≥2050 mm	≥2310 mm
ø 160 mm (PEHD)	≥2140 mm	≥2400 mm
ø 200 mm	≥2060 mm	≥2320 mm

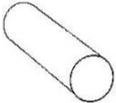
Is the place of installation in compliance with the regulation in force and with the IP protection grade?	<input type="checkbox"/>
Does the installation site disposes a main electrical source 220-240 V 50 Hz single phase? Is easy to access for installation and maintenance?	<input type="checkbox"/>
The power lines on which you can connect the device are protected from power surges?	<input type="checkbox"/>
Is possible to provide adequate safety devices like thermostatic mixing valve, pressure reducer and expansion vessel?	<input type="checkbox"/>
The connections disposal will create obstacles to the access of the flange and plastic caps?	<input type="checkbox"/>

Check if the installation site:	<input type="checkbox"/>
• avoids problems due to noise and air flow;	<input type="checkbox"/>
• allows free passage;	<input type="checkbox"/>
• allows the evacuation of the condensed water;	<input type="checkbox"/>
• avoids the clogging of the evaporator and its filter or the ducts (leaves, dust...);	<input type="checkbox"/>
• avoids the damaging for accidental contact.	<input type="checkbox"/>
The floor allows an installation perfectly vertical (verify with a spirit level)	<input type="checkbox"/>

Materials and tools for installation	
Beware: be in compliance with the regulations in force in terms of health and safety in the workplace	
Packed device handling:	<input type="checkbox"/>
• handle by hand or truck lift	<input type="checkbox"/>
• in the case of lifting with hoists be sure about the stability in relationship with the weight of the device	<input type="checkbox"/>
WARNING! Absolutely imperative that the unit is transported and stored in an upright position. However is possible to handle in horizontal position for short time and only on rear side.	
• Hole saw for concrete ø150 – 200 mm, if the installation involves making a hole for air canalization	<input type="checkbox"/>
• Pipes and fittings for hydraulic connection	<input type="checkbox"/>
• It is mandatory to fit a safety valve onto the appliance's water inlet pipe. The device must comply with the EN 1487:2002 standard and must have a maximum pressure of 0.7 MPa (7 bar). Moreover, it must at least include the following components: a cut-off valve, a non-return valve, a control mechanism for the non-return valve, a safety valve and a water pressure shut-off device; together with a dripping water discharge pipe.	<input type="checkbox"/>
• Safety devices like thermostatic mixing valve, pressure reducer, expansion vessel	<input type="checkbox"/>
• Generic tools: screwdrivers, meter, cutter, scissors, gloves, 3/4" torque wrenches, Teflon...	<input type="checkbox"/>

Available installation accessories

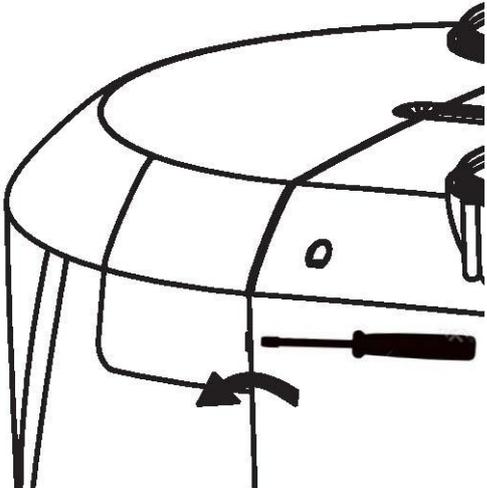
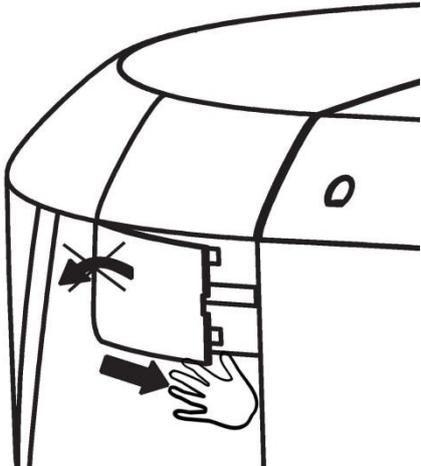
		ø150		ø200		Pa MAX: 230
Pa	m _{equivalent}	Pa	m _{equivalent}	Pa	m _{equivalent}	

1m PVC		9	1	3	1
1m Al		17	1,9	5	1,7
Grille		18	2	10	3,3
90° PVC		27	3	9	3
90° Al		19	2,1	10	3,3

SAFETY HYDRAULIC GROUP (for water inlet pipe 3/4'') + SYPHON					
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APPENDIX B: ROUTINE MAINTENANCE

Pay attention to the procedure to remove the four screw covers on frontal plastic cover:

1) Helped by a screwdriver, unblock first two snaps of screw cover.	2) Not rotate the screw cover but extract horizontally.
	

It is recommended an annual cleaning of the evaporator filter to remove any dust or obstructions. The filter can be extracted using the appropriate clip (refer to relative par.). Clean the filter with water and mild soap.

Verify that the external terminal of the air exhaust duct, and the duct itself, are not obstructed or have not deteriorated.

Ensure that the condensate water runs out in a suitable drain and make sure the discharge is made without hindrance.

Check and clean canalizations and grills.

It is advisable to rinse out the appliance after each routine or extraordinary maintenance intervention.

The pressure safety device must be operated regularly to verify that it is not clogged and to remove any limescale deposits.

Check that the condensate drainage pipe is not obstructed.

Check the perfect cleaning of grids and ducts.



This product conforms to WEEE Directive 2012/19/EU.

The barred bin symbol on the appliance and its packaging indicates that the product must be scrapped separately from other waste at the end of its service life. The user must therefore hand the equipment over to a sorted waste disposal facility for electro-technical and electronic equipment at the end of its service life. Alternatively, the equipment may be returned to the retailer at the time of purchase of a new equivalent type of appliance. Electronic equipment of size less than 25 cm can be handed over to any electronics equipment retailer whose sales area is at least 400 m² for disposal free of charge and without any obligation to purchase new product. Sorted waste collection for recycling, treatment and environmentally compatible scrapping contributes to the prevention of damage to the environment and promotes reuse/recycling. For more detailed information on the collection systems available, contact the local waste disposal service or the shop where the product was purchased.

The appliance is not provided with rechargeable batteries, but if you use them they must be removed and put into a specific container before disposing of the appliance. The batteries seat is behind the front frame.